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THE IRON AGE

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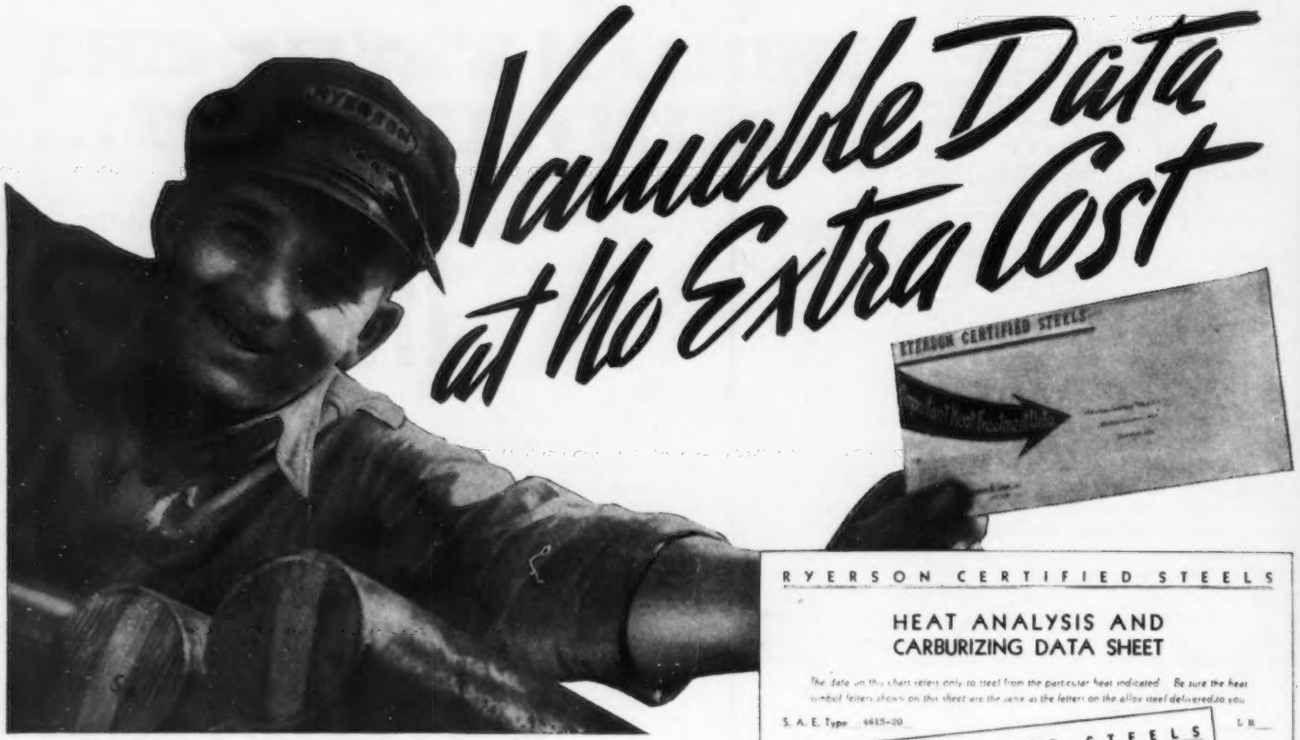

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Inherent Grain Size 6-7 Inclusions (Automatic Classification) Oxides 4 Silicates 3

HEAT TREATING CHARACTERISTICS

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Tensile Strength

Yield Point

Brinell

% Reduction

% Elongation

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▲▲▲ THE IRON AGE ▲▲▲

MARCH 16, 1939

ESTABLISHED 1855 Vol. 143, No. 11

War – Overproduction – Unemployment

FOLLOWING along the lines of thought expressed last week on this page, namely that invention and improvement are not to blame for present unemployment, let's think about what war—and the preparation for war—does to a nation's industry.

First, it develops an unnatural and abnormal expansion of productive capacity.

Those of you who are old enough to remember what went on in 1917 and 1918 may remember the mushroom growth of plants, financed by Uncle Sam, that occurred during this period.

What happened to these plants after the War? What happened to the new machinery with which they were equipped? Were the plants burned down and the machinery thrown on the scrap pile? No, indeed! Uncle Sam, with characteristic liberality, sold these buildings and their equipment to private industry.

And private industry, no longer facing a market and a demand for war material, turned these plants over to the production of peace-time products.

There was plenty of labor then to man these plants. To man and to woman them. For you may also remember how, to make up for the boys who went abroad to fight for democracy, we combed the nation for able-bodied housewives who were willing to swap aprons for overalls in return for $6 a day.

And so what happened? Just this. Whereas, under normal conditions, industrial plant capacity and the number of people engaged in industry increase in accordance with the normal increase in consuming power of the nation, the abnormal demands of war and armament production induced a sudden and unwarranted jump in both that normally might have been justified 10 years later.

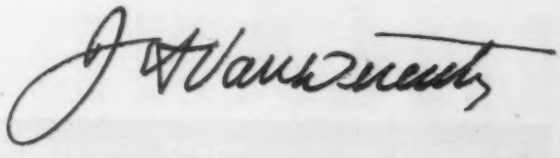
And again, what happened? Spurred by the false impetus of huge Government spending, we entered the golden 1920's 10 years too big for our breeches. The golden era when half of the servant girls in America had a credit balance at some stockbroker's office. The silk shirt, crap shooting era with two cars in every garage and two chickens in every pot.

Then came the deluge. And now we hear people say that invention and improvement are to blame for it!

When a man climbs to the top of a 20-story building and then jumps off, you can hardly blame the architect or the builder.

A product—almost any product—can be used constructively or destructively. Should we condemn the chemical industry, which produces so many remedies to save and lengthen life, for the relatively few cases of accidental or intentional poisoning which take place?

So it is with the machine and mechanization. In view of what these have done for this country, should we condemn them because of mistaken judgment in their use?



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WHAT ABOUT GRAIN SIZE?

o o o

By CARL L. SHAPIRO
Consulting Engineer, New York

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PART I: Which deals with various methods by which austenitic grain size is determined. Part II, which describes the factors influencing the austenitic grain size, and Part III, setting forth the effect of the austenitic grain size upon the mechanical and physical properties of steel, will appear in following issues.

o o o

INASMUCH as time does not permit most executives, metallurgists, plant superintendents and heat treaters to devote many hours per day reading foreign and domestic publications dealing with controlled grain size or, technically speaking, the austenitic grain size of steel, the writer attempts to present within the scope of this paper a concise version of grain size control. To accomplish this in the briefest manner, it is necessary to divide the paper proper into three sections, which describe in turn (a) the various methods by which the austenitic grain size is determined, (b) the factors which influence the austenitic grain size, and (c) the effect of the austenitic grain size upon the mechanical and physical properties of steel.

Before describing the various methods by which the austenitic grain size may be determined, it seems appropriate at this time to state that no mention whatever is made of the "inherent grain size" of steel in this paper. "Inherent grain size" is a mistaken idea. There are "inherent grains" and "inherent characteristics" in steel but no "inherent grain size" since grain size can be refined or coarsened by proper thermal or mechanical treatments. Hence, it is suggested that the term "inherent grain size" be omitted from our vocabulary as has already been done by most of the leading metallurgists.

The various test procedures used today to determine the austenitic grain size in steel may be classified under one of the following methods:

(I) Etching at room temperature to reveal the austenitic grain size that existed prior to cooling.

(II) Etching at elevated temperatures and observing the structural condition that existed at this temperature by microscopic examination at room temperature.

(III) Fracture examination at room temperature.

The outstanding tests of these three methods, which are used to determine the austenitic grain size in steel, are described briefly below:

METHOD I. *McQuaid-Ehn Carburizing Test:* This test consists of pack carburizing for a definite period of time at a standard temperature followed by cooling slowly. The duration of time usually is 8 hr. and the temperature is 1700 deg. F. The austenitic grain size is denoted by a cementitic network around the pearlitic grain which indicates the parent austenitic grain whence it originated. Further interpretation and evaluation of this test are defined by the A. S. T. M. Standards (Designation E 19-33T).

Optimum Rate of Cooling: The principle employed in this test procedure is to delineate the austenitic grain size by precipitating a constituent during cooling in the austenitic grain boundaries. This is easily accomplished in hyper-eutectoid steels containing more than 0.90 per cent carbon simply by air cooling from any desired temperature above the thermal critical range. This normalizing treatment (air cooling) rejects the excess cementite from the austenitic grains into the grain boundaries, thereby delineating the original parental grain. However, in steel of eutectoid composition, which contains neither an excess of ferrite nor of cementite, Davenport and Bain[1] recommend another treatment. In specimens of approximately one inch thickness, which cannot harden all the way through, they advocate that the specimen be brine quenched, cross-sectioned and

[1] E. S. Davenport and E. C. Bain, Transactions A. S. M., Vol. XXII, 1934, p. 879.

examined microscopically for grain size. The austenitic grain size is revealed between the hardened case (martensitic) and core (troostite) by the troostitic boundaries around the martensitic grains. If the eutectoid steel is not of sufficient thickness to yield a case and core effect upon quenching, Davenport and Bain advise a gradient-quenching treatment which consists of heating the specimen to the desired austenitizing temperature and quenching one end of the specimen in brine while the other end is air cooled. By this method, a continuous series of cooling rates is obtained and the structural conditions range from martensitic, in the quenched portion of the specimen, to fine pearlite in the air cooled extreme. The austenitic grain size is observed near the martensitic portion of the gradient bar by the troostitic boundaries around the martensitic grains.

In hypo-eutectoid steels, Vilella and Bain[2] showed that the austenitic grain size may best be determined by the gradient quenching treatment since the grain size may be checked by two methods: (1) by the ferrite network, and (2) by the fine pearlite (nodular troostite) around the martensite grains. Examples of this new method are shown in Figs. 1 and 2.

Quenching and Etching: Another test to ascertain the austenite grain size is by etching hardened (martensitic) steel to reveal the parent austenitic grain. This procedure involves a careful polishing and etching technique to develop the required contrast between the grain and boundaries. The etchant used by Vilella and Bain to disclose the austenitic grain in hypo-eutectoid, eutectoid and low-alloy steels is composed of one gram of picric acid, 5 cc. in 95 cc. ethyl alcohol. Their etching procedure is to immerse the specimen from 5 to 15 sec. in the above acid, repolish slightly two or more times and re-etch to develop maximum contrast in the microstructure. Although this test is capable of bringing out the austenitic grain in fully hardened and untempered steels, it seems to work best when the specimens are slightly tempered at 400 deg. to 600 deg. F. (200 deg. to 300 deg. C.) for a short time (15 min.).

Another etchant which seems to work very satisfactorily was suggested by Tobin and Kenyon[3]. This etchant is a 15 per cent alcoholic hydrochloric acid solution. The time of etching ranges from 1 to 10 min., depending upon the heat treatment of the specimen to be examined.

In hardened hyper-eutectoid steels, Schempp and Shapiro[4] developed the parent austenitic grain size by etching in a solution of one per cent picric and nitric acid in alcohol for 2 to 5 min., washing in alcohol and drying. Another etchant which worked very successfully in hardened and tempered hyper-eutectoid steel was a 10 per cent solution of nital (15 cc. HNO_3 per 100 cc. ethyl alcohol). In high alloy steels such as stainless and high speed steels, they found that an aquaregia solution (3 HCl:2 HNO_3) in methenol (absolutely pure methyl alcohol) in the proportions of 1:1 or 1:3 gave excellent results regardless of whether the material was in the hardened, tempered or annealed condition.

METHOD II. *Etching at Elevated Temperatures:* This method of determining the austenitic grain size involves the etching, or chemical attack, of polished specimens in some corrosive medium such as a gas, liquid

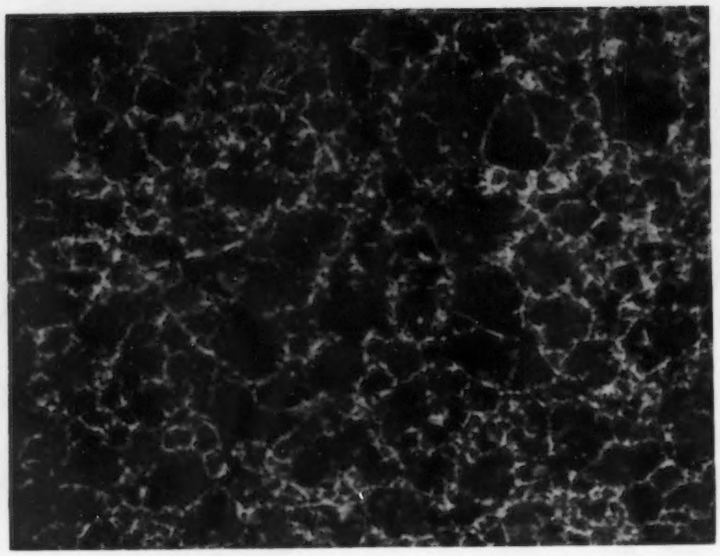

FIG. 1—Austenitic grains outlined by a network of free ferrite, in a 0.50 carbon steel. (Vilella and Bain)

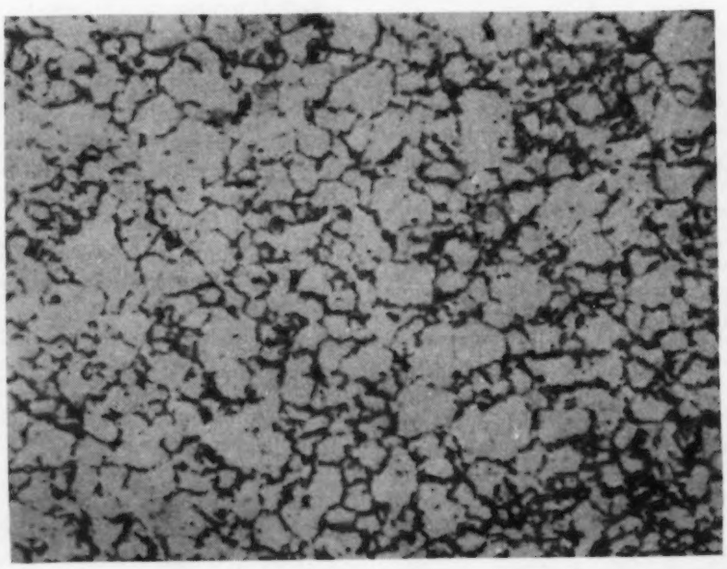

FIG. 2—Austenitic grains outlined by a network of fine pearlite (nodular troostite) in a 0.50 carbon steel. At 100 diameters. (Vilella and Bain)

[2] J. R. Vilella and E. C. Bain, Metal Progress, Sept., 1936, p. 39.

[3] H. Tobin and R. L. Kenyon, Transactions A. S. M., Vol. XXVI, 1938, p. 133.

[4] R. Schempp and C. L. Shapiro, Transactions A.I.M.E., 1937.

[5] P. Gruzdoz and I. Fedorchenka, Kachestvennaya, Stal. 5, No. 3, 1937, p. 40.

[6] B. F. Sheperd, Transactions A. S. M., Vol. XXII, 1934, p. 979.

or molten salt at elevated temperature. The austenitic grain size is revealed at room temperature after a careful polish and microscopic examination.

Molten Salt Method: This test developed by Schempp and Shapiro[4], consists of immersing a polished specimen, attached to a fine wire, in a molten chloride compound (cadmium chloride) at any desired temperature for 5 to 10 min., quenching in water, washing in alcohol and examining for grain size after a slight repolish.

The above method has recently been successfully modified by various Russian investigators with excellent results. Instead of a molten salt bath, the polished specimen is etched in a chloride gas atmosphere at the desired temperature. This modification not only improves the etching technique but removes the hazards involved in the handling of molten chloride salts.

Oxidizing Method: Another method of etching at elevated temperatures to reveal the austenitic grain size consists of etching polished specimens in an oxidizing atmosphere. This test was suggested by Gruzdoz and Fedorchenko[5], who recommended that polished specimens be placed in a preheated muffle furnace for a short period of time, quenched, polished slightly, etched in picral or nital and examined microscopically for grain size. This test is particularly suited for low carbon steels and may be improved by leaving a moist surface upon the polished specimen, prior to heating, in order to facilitate the oxidizing attack and intensify the contrast between the grain and boundaries.

Decarburizing Method: Inasmuch as the ordinary methods of determining the austenitic grain size cannot be applied readily to very high carbon steels and to those which are heated above 1900 deg. F., the grain size is effectively ascertained by decarburizing specimens at any desired temperature. The procedure employed is very simple since it consists of heating the polished specimen in an oxidizing atmosphere until decarburization occurs, quenching in water or oil, cross-sectioning, polishing and examining microscopically after etching. The austenitic grain size is read between the columnar decarburized grains and the original undecarburized matrix. The only precaution necessary is to read the grain size on the polished cross-section of a decarburized specimen and not on the longitudinal surface of the decarburized piece.

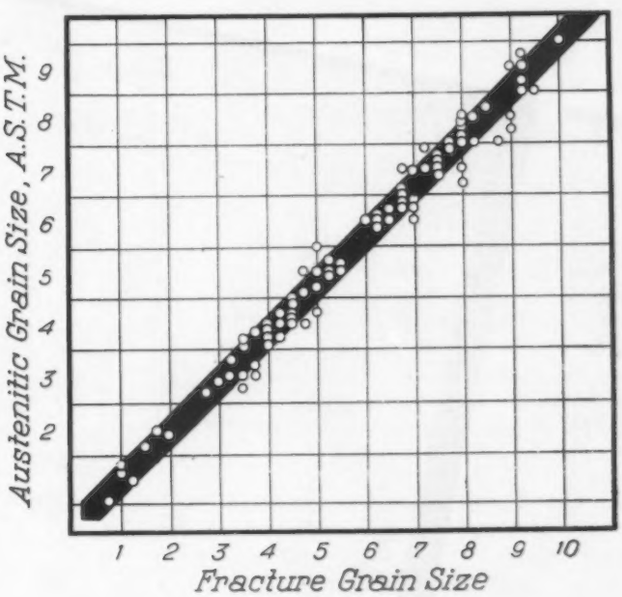

FIG. 3 — Comparison of Jernkontoret and Shepherd scales of fracture grain size, showing them to be equivalent within the limits of the black band. The circles shown here correlate these fracture grain sizes and the austenitic grain size of individual samples as determined by the new microscopic methods.

METHOD III. *Fracture Examination of Hardened Specimens:* The last method by which the austenitic grain size may be determined is by the fracture examination of hardened specimens. This test was used practically at the dawn of metallurgy since smiths and, then later, heat treaters, fractured hardened specimens in order to examine "the body" of the specimen. This test of fractured grain size was first standardized by the Swedish Iron Masters' Association in Sweden and later by Shepherd in America. The former employed ten fractured standards whereas Shepherd graded the fracture grain size in only eight numbers. These two standards are correlated by Vilella and Bain[3] in Fig. 3.

Shepherd's Penetration - Fracture (P-F) Test: Although this test is of recent origin[6], it has become too well known to describe fully herein. However, it consists essentially of heating definite size standards (3 in. long × ¾ in. in diameter) to 1450 deg, 1500 deg., 1550 deg. and 1600 deg. F. for 30 min. respectively, and quenching in a specially designed vertical jig flushed with a 10 per cent brine solution. The hardened specimens are dried, notched midway, fractured and examined for grain size by comparing the fractured surface with the set of standards. The fractured grain size is read in whole and quarter numbers, such as 8¼, 7¾, 7, and 6½, for the various hardening temperatures (1450 deg., 1500 deg., 1550 deg. and 1600 deg. F.).

To summarize the foregoing, the use of the following tests is recommended for determining the austenitic grain size in various types of steel, although individual occasions require special etching technique and modifications of each and every test.

Low Carbon Hypo-Eutectoid Steel: The McQuaid-Ehn carburizing test is recommended since it denotes the grain size, the normality of the steel and the coarsening temperature.

Moderately Hypo - Eutectoid and Eutectoid Steels: The gradient quenching treatment is advocated since it is the most accurate and simplest.

Hyper-Eutectoid Steel: If a general idea of grain size is desired, air cooling from above the critical is sufficient. However, if an accurate grain size count is necessary, the Shepherd P-F test is recommended.

Alloy Steels: In high carbon alloy steels, the austenitic grain size should be determined by either the decarburizing method or by hardening and etching. If the steel is austenitic in character, the aqua-regia etchant is appropriate; if ferritic, Vilella's and Bain's etchant is more suitable.

The shortcomings of the various methods are that they may require too long a time (McQuaid-Ehn Test), a fine polishing and etching technique (quench and etch method), or special facilities.

Ed. Note: The second part of this three-part article, that dealing with the facts influencing the austenitic grain size, will appear within two weeks.

Some Notes on the Early Manufacture of St

TWO pages from the note book of Frank Garratt showing data on the manufacture of the country's first cutlery stainless and stainless iron on May 26 and June 2, 1914. Although corrosion tests showed excellent results, the World War interfered with further commercial development of this important series of alloys.

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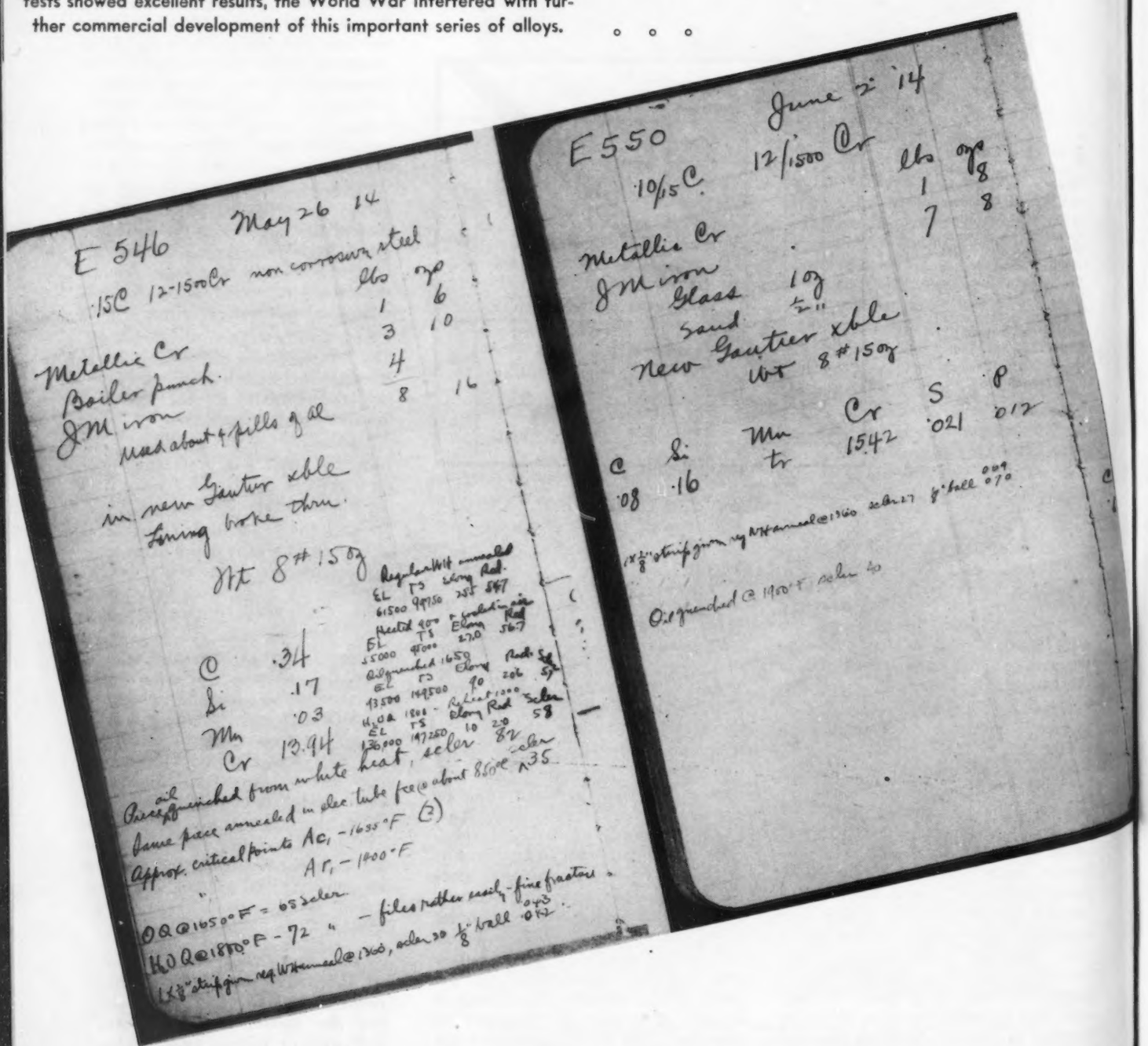

f Stainless Steel in the United States

By FRANK GARRATT
Vice-President and Technical Director, Universal-Cyclops Steel Corp.

o o o

THE IRON AGE of Dec. 22, 1938, carried an account of an interesting dinner held in Pittsburgh to celebrate the twenty-fifth anniversary of stainless steel. The occasion brought to the writer's mind his first experiences with this interesting metal, and it is thought that the circumstances attending the melting of the first small heats, and the results obtained, may be of interest to others at this particular time.

During the early part of 1914, the writer, who was at that time in charge of chemical and metallurgical work for the Firth-Sterling Steel Co., McKeesport, Pa., was called upon to make some non-corrosive steel being developed by Harry Brearley, of Thos. Firth & Sons, Sheffield, England. Mr. L. Gerald Firth, who is now president of the Firth-Sterling Steel Co., was at that time connected with the Firth interests in Sheffield. He had brought to McKeesport in 1914 some interesting accounts of the work being done at Sheffield, and requested that similar material be made to further investigate the new type of steel.

The metallurgical laboratory at McKeesport was equipped with a small electric melting furnace of the carbon plate resistor type that accommodated a crucible of about 10-lb. capacity, and it was planned to make some of the new steel in this small furnace. The crucible was of the plumbago type, commonly used for steel melting purposes, and had a clay lining to prevent carbon contamination from the graphite of the crucible.

At the time of making the material, the optimum carbon content was somewhat uncertain, and it was Mr. Firth's thought that we should aim for a carbon content of about 0.15 per cent in the first heat. The "mix" was accordingly proportioned to yield such a figure, but the clay lining of the crucible cracked during the melting operation, and the metal absorbed sufficient carbon from the crucible to finish 0.34 per cent, with the chromium content showing 13.94 per cent.

The writer has always considered it a curious fact that this first heat, by accident rather than design, yielded steel which is today considered of ideal carbon content for cutlery purposes. The result could hardly be improved, although the chromium content is slightly higher than desirable for a carbon content of 0.34 per cent if maximum hardness is desired. It is believed that this was the first stainless steel, intended for cutlery purposes, made in this country.

If the first trial was interesting, the second was equally so. One week later, after having obtained the chemical analysis of the first melt, another ingot was made, and in order to compensate for some possible carbon "pick-up" in case of another accident with the clay lining of the crucible, a "mix" was made of carbon-free chromium metal and low-carbon Swedish iron. The clay lining behaved beautifully in this case, however, and the resulting ingot was found to contain 0.08 per cent carbon, and 15.42 per cent chromium. The carbon content will be recognized as ideal for present day stainless iron, thus repeating the previous performance of obtaining an ideal composition by accident rather than design. It is also believed that this was the first stainless iron, intended for general corrosion resistance, that was made.

Preliminary corrosion tests made on annealed material from heats E546 and E550 soon emphasized the importance of low carbon material in resisting general corrosion such as encountered in domestic use and in weathering, but a series of circumstances interfered with the commercial development of the stainless iron type of material. The outbreak of the European War late in July, 1914, immediately resulted in considerable pressure of work at the McKeesport plant, and discouraged any further efforts of a development nature.

Two pages from one of the writer's old note books showing data covering the melting of heats E546 and E550 are reproduced herein. The data reproduced represent the first stainless steel and stainless iron materials produced in this country.

New Turbine Alloys Tested for Creep

ERNEST L. ROBINSON, turbine engineer of the General Electric Co., recently described the creep tests to which his company subjects steel used in power plant turbines in order to determine the amount of expansion and relaxation that will take place in the metal during the life of the units.

In these tests, sample rods of various steels are sentenced to terms as long as 10 years' solitary confinement in electric furnace "cells" where constant temperatures as high as 1200 deg. F. are maintained. According to Mr. Robinson, it is probable that the length of the terms the rods will have to serve in the future will be shortened to a five-year maximum because the more rapid developments in steel that have come with increased knowledge of the metal make longer tests impractical.

Instruments used to take the regular measurements of changes occurring in the metal in the creep tests disclose expansions as small as a millionth of an inch per inch of length. Steel in a turbine must be restricted to an expansion of only a hundred-millionth per hour, and whatever changes do occur from time to time must be symmetrical and uniform; otherwise the turbine shell may leak, or its fast-whirling rotor may get out of line.

Mr. Robinson states that one part molybdenum or two parts tungsten will help slow down the distortion rate of steel, and provided the metal is given proper heat treatment it will be able to withstand 200 deg. F. hotter temperatures as a result. Generous portions of nickel and chromium also are desirable ingredients in steel that is to be subjected to temperatures above 1000 deg. F.

Factors Affecting Selection of F

By H. M. WEBBER
Industrial Department, General Electric Co., Schenectady, N. Y.

A TYPICAL furnace - brazing equipment consists of an electrically - heated furnace with cooling chamber, along with the necessary power and temperature control and an auxiliary device for supplying protective atmosphere to the furnace.

The most common types of brazing furnaces are the box-type, the mesh-belt-conveyor type, and the roller-hearth conveyor type. Choice of the type of furnace to be used depends upon a number of factors, important among which are the rate of production, the weight, shape, and size of the assemblies, the price of the equipment, and the cost of operation and maintenance. Just how these factors affect the choice is brought out in the discussions of the individual types below.

The Box-Type Furnace

A box-type furnace is shown in Fig. 82. It has a heating chamber interconnected with a water jacketed cooling chamber, and a refractory door between the two to keep the heat in. Controlled atmosphere is maintained within both the heating and cooling chambers, supplied from a separate source. End doors are provided for charging and discharging the work which is moved through intermittently in trays or baskets. The trays rest on cast-alloy rails within the heating chamber and on the bottom plate of the liner in the cooling chamber. The cooling chambers of the box-type and other types of brazing furnaces are generally made sufficiently long to provide about three times the heating period for cooling, this having been found essential for average work in order to cool the parts sufficiently to bring them out bright. This means that in the box-type furnace the heating chamber holds one tray and the cooling chamber three.

Flexibility a Feature

The box-type furnace has an advantage in that it is suitable for brazing assemblies of almost any weight—light, medium, or heavy. It is best for low rates of production, or developmental work, because of its relatively small size, but in some cases multiple units have been installed to increase the output. The furnaces are, of course, available in different capacities, typical of which are ratings of 50, 150, and 250 lb. gross per hour including work and trays. These ratings are for

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FIG. 82—G-E box-type brazing furnace used for brazing at all temperatures up to 2100 deg. F. Work is loaded in trays or baskets. While one tray load is being brazed in the heating chamber, three tray loads are being cooled in protective atmosphere in the cooling chamber.

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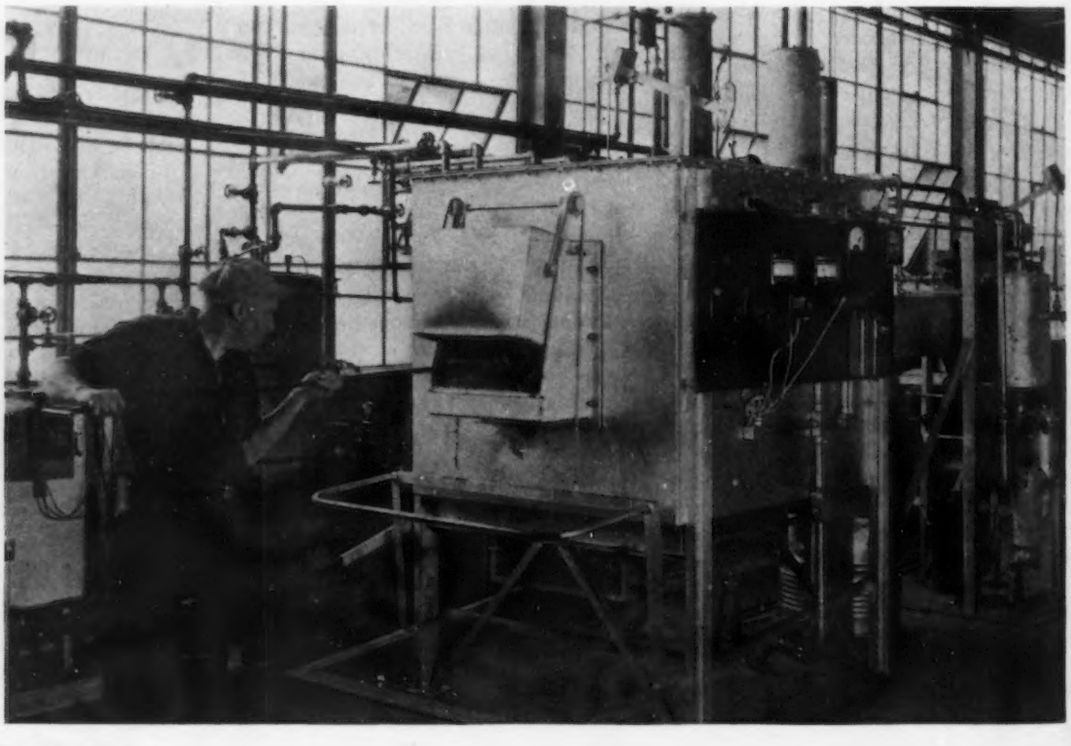

f Furnace-Brazing Equipment

copper brazing at 2100 deg. F., and depend upon the ability of the assemblies to absorb heat. For low-temperature brazing these furnaces have capacity to heat more work, but the slower rate of heat absorption by the work at lower temperatures should be taken into account.

The box-type furnace is relatively low in first cost and maintenance because there is no conveyor or mechanism involved. Another feature is its flexibility. It can be used not only for furnace brazing, but also for bright annealing or normalizing, scale-free hardening, or pack carburizing. Parts to be brazed, bright-annealed, or normalized are first heated, then pushed from the heating chamber to the cooling chamber in trays or baskets, where they are allowed to cool at a normal rate in the protective atmosphere. For scale-free hardening, hinged-bottom trays are employed and quench chute is provided in the bottom of the cooling chamber as shown in Fig. 83. When the parts in the trays are thoroughly heated, the trays are pushed out of the heating chamber one at a time over the quench-chute opening, where the hinged bottoms drop and allow the parts to fall into the quenching medium, then the trays are pulled out at the discharge end of the cooling chamber. Being in the protective atmosphere the entire time, the parts have clean surfaces free from oxides and scale. Because of the uniform heating provided by the electric heat, and the quick transfer to the quench, the parts are uniformly hard and can be held to close specifications.

WHY, where and how to use electric-furnace brazing has been covered by Mr. Webber in previous articles of this highly informative series. In this article, the 10th, he describes the various types of furnaces and discusses the influence of production rate, size of assemblies, cost of operation and maintenance and other factors in meeting individual requirements.

The interior of a typical box-type brazing furnace under construction is shown in Fig. 84. The view is looking down into the furnace before the hearth rails are installed and before the flat roof tile and insulating blocks are laid in place. Heavy side-wall nickel-chromium ribbon resistors are shown hanging on refractory hooks built into the light-weight refractory lining, and floor units in the end bays are also in evidence. The latter provide compensation for the heat losses at the ends of the furnace and thus give maximum working length. Thermal insulation, in the form of large blocks or slabs, backs up the refractory lining and is enclosed in a sheet-steel casing welded gas tight. This brazing furnace, as with the others described below, is built to give long life in copper-brazing service at about 2100 deg. F. but it is equally suitable for use with lower-melting brazing metals at reduced furnace temperatures.

A typical charging cycle starts with pulling the end tray out of the cooling chamber, then pulling the other two trays toward the end so that an empty space is left next to the heating chamber. The operator then goes to the charging end of the furnace, pushes the hot tray of brazed assemblies into the cooling chamber, and pushes a new tray of unbrazed assemblies into the heating chamber, where it remains until the parts heat up and braze, at the end of which time the foregoing cycle is repeated.

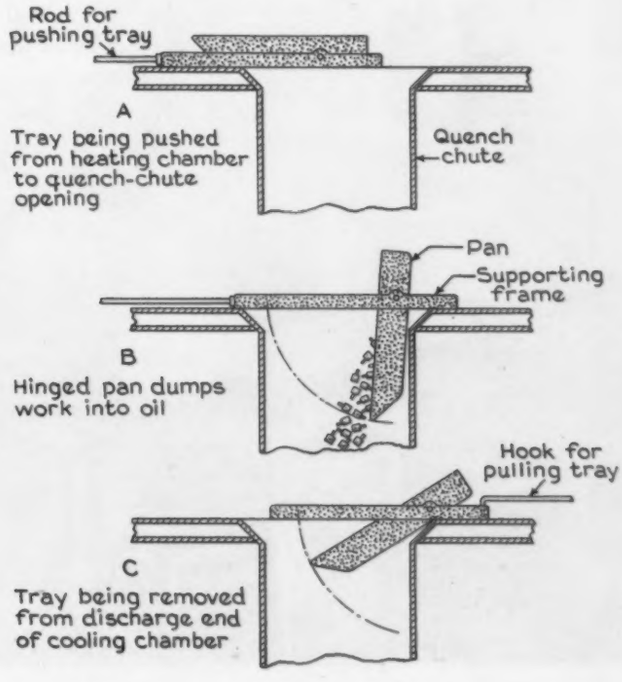

FIG. 83—The box-type furnace can be used for scale-free hardening by quenching parts from hinged-bottom trays through a quench chute in the bottom of the cooling chamber.

Various Styles of Trays Employed

Trays for brazing are available in a number of styles for different types of service. For example, wire-mesh trays woven with heat-resisting alloy

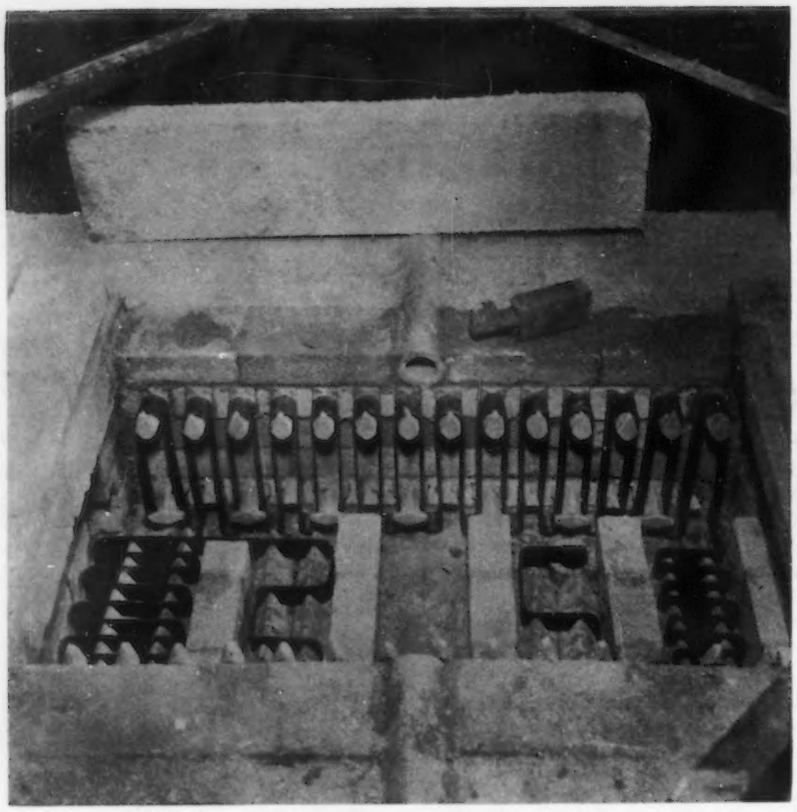

FIG. 84—Looking into the top of a box-type copper-brazing furnace under construction. Heavy ribbon-type heating elements are hung on the side walls and supported in the floor end bays by means of refractory insulators.

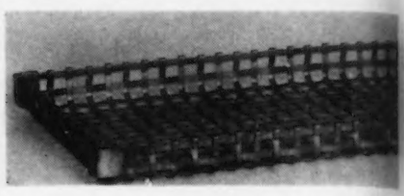

FIG. 85—One of several styles of trays used for furnaces. This one is made

wire such as 80 Ni-20 Cr in about ¼-in. mesh and with turned-up edges are sometimes employed for brazing small light-weight assemblies such as those for business machines. For heavier loading, ribbon-mesh trays such as that shown in Fig. 85 are applicable. For still heavier loading, the ribbon-mesh trays are reinforced around the rim, or on the bottom, or both. For exceptionally heavy loadings cast trays are sometimes used, the design of which is generally patterned to best support the assemblies with which they are used. Special rods and hooks are required for pushing the trays into the heating and cooling chambers and for pulling the trays out of the cooling chamber.

Mesh-Belt Type Furnace

The mesh-belt conveyor-type brazing furnace, shown in Fig. 86, is built similarly to the box type, in that it has a heating chamber and cooling chamber attached, but in addition it is equipped with a conveyor with drive and take-up mechanisms. Assemblies to be furnace brazed are generally loaded

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FIG. 86—The mesh-belt conveyor-type brazing furnace is eminently suited for continuous production. It can be used either for furnace brazing or bright annealing, and features uniformity of time, temperature, and atmosphere.

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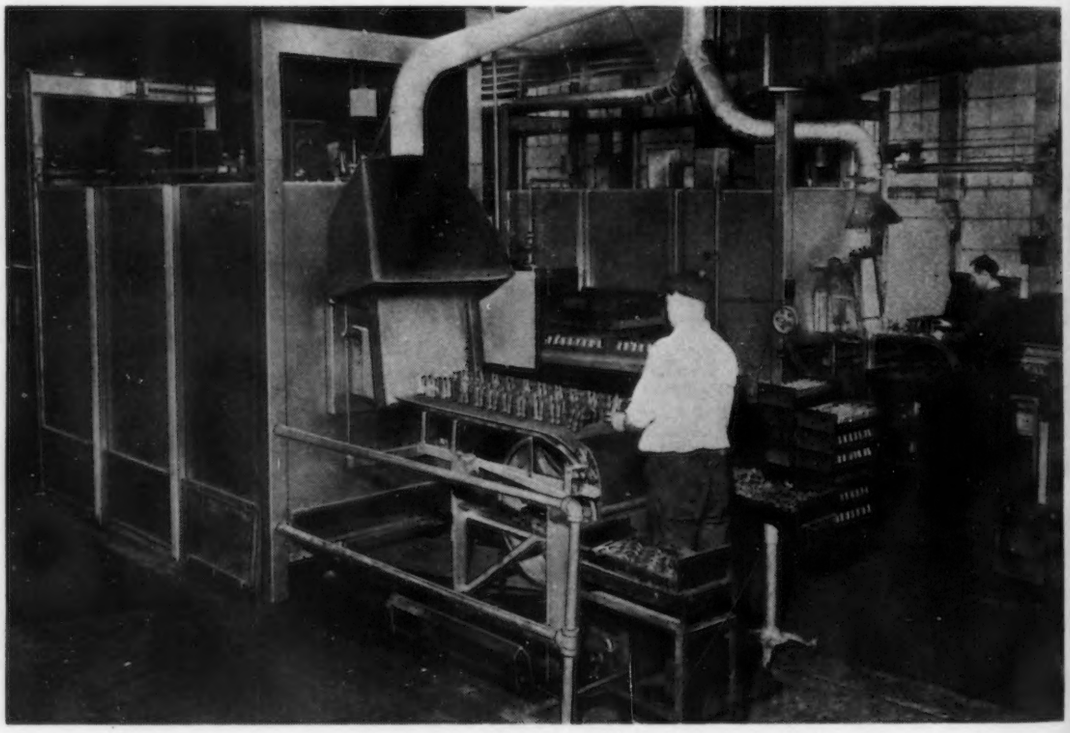

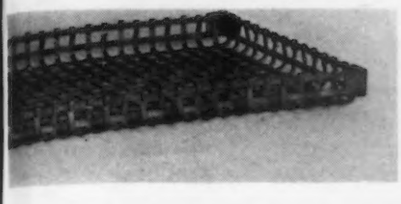

carrying assemblies through box-type brazing of heat-resisting alloy ribbon.

directly upon the belt which is supported by cast heat-resisting alloy rails, grids, or hearth plates in the heating chamber, and by the bottom plate of the liner in the cooling chamber. The belt is usually made of heat-resisting-alloy wire such as 80 Ni-20 Cr, the same alloy as in the ribbon resistors. The drive mechanism is constructed so that the belt speed can be adjusted over a 6-to-1 range in order to braze assemblies of widely different heating characteristics.

The mesh-belt furnace is best suited to relatively light-weight work in quantities greater than those practical for handling intermittently in the box-type furnace. It is available in a number of sizes, but the heating-chamber length is limited by the pull of the load behind the hottest and thereby weakest portion of the belt. Accordingly, the longer the furnace the lower the permissible loading on the belt as expressed in net pounds per square foot uniformly distributed, for a given belt-life expectancy. Typical maximum loadings used vary from 7½ to 4½ lb. net per sq. ft., decreasing as the heating-chamber length increases.

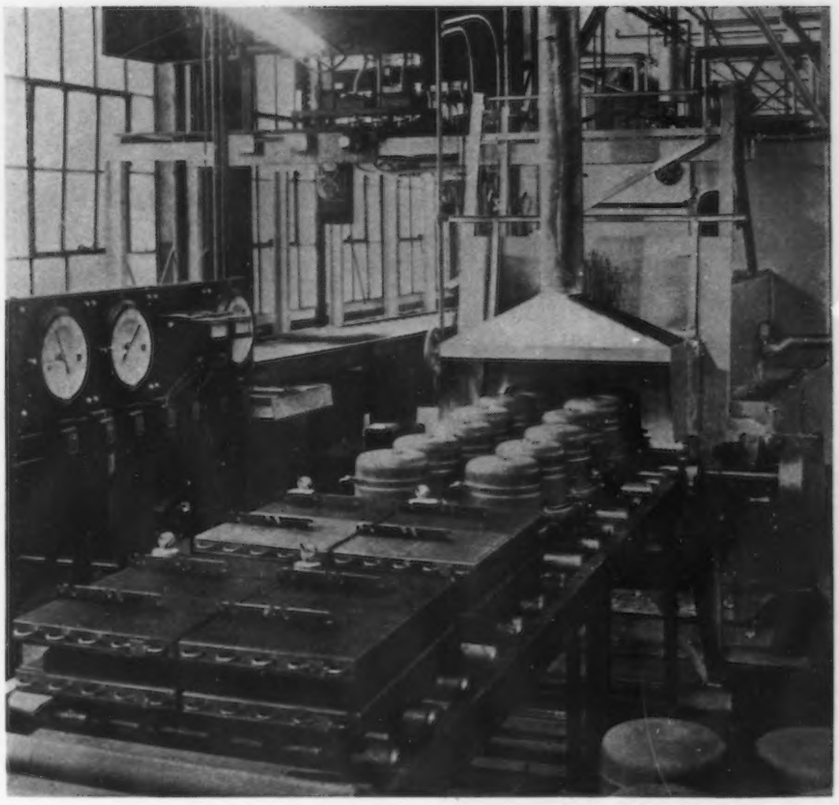

FIG. 87—Roller-hearth conveyor-type furnace in the Kelvinator plant at Detroit, copper brazing refrigerator sub-assemblies such as steel-fin condensers and shells for hermetic units. Charging end.

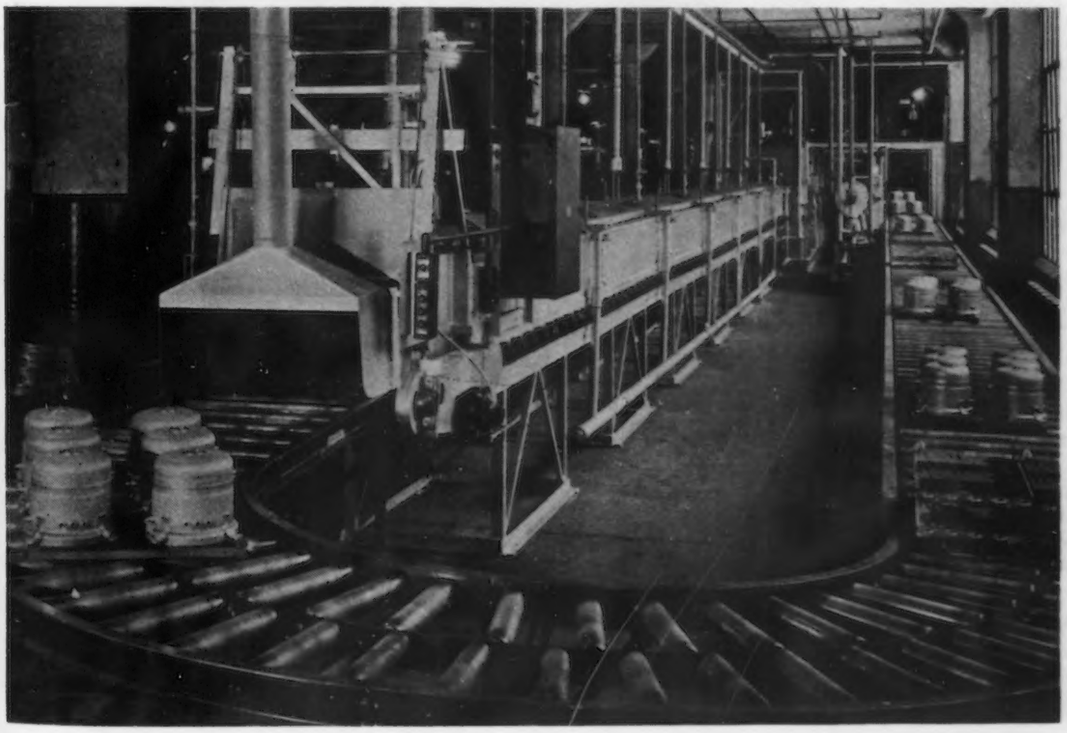

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FIG. 88—Discharge end of Kelvinator roller-type furnace. Trayloads of work automatically emerge from the cooling chamber and return to the charging end on a roller conveyor, where the trays are unloaded, transferred to the charging table, loaded and pushed near the door as shown in Fig. 87. Charging is automatic and self-timed.

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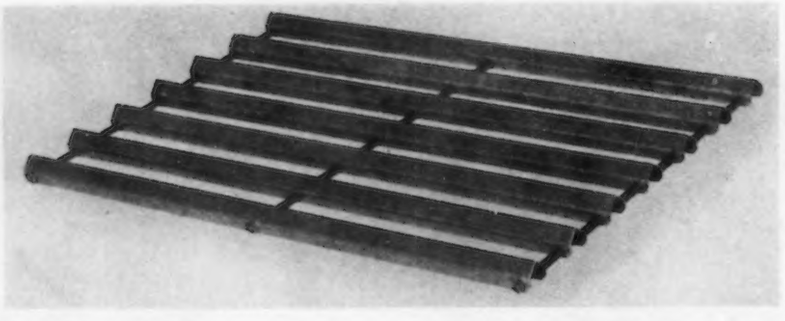


FIG. 89—Flexible trays such as this are employed for carrying assemblies through the roller-hearth. They are made of channels formed from sheet alloy.

Mesh belts commonly employed, using these loadings in copper-brazing service, weigh about 3½ lb. per sq. ft. For lower-temperature brazing the belt loadings increase considerably, and lighter belts are sometimes used. Typical ratings of mesh-belt furnaces for copper brazing are 150, 250, 500 and 700 lb. gross per hour including the work and the conveyor.

The mesh-belt furnace can be considered as a production line machine, its continuous feature providing control of the uniformity of time during which the assemblies are in the heating and cooling chambers. Accessories provide control of the uniformity of temperature and protective atmosphere. Uniformly high-quality work is thereby assured.

Roller-Hearth Type Furnace

The roller-hearth-type furnace, such as the one in the plant of the Kelvinator Division, Nash-Kelvinator Corp., Detroit, shown in Figs. 87 and 88 has the same arrangement of heating and cooling chambers as the box and mesh-belt types, but differs in the types of conveyor and carriers. The conveyor consists of a series of driven rolls throughout the furnace which extend through the furnace walls to self-alining ball bearings mounted on the outside of the casing. The rolls have individual sprockets driven by endless chains which run alongside the heating and cooling chambers in gas-tight boxes. The assemblies to be brazed are loaded directly on the roll table if they are long enough, or loaded on cast-alloy rails, or on fabricated trays, made of cast rails or sheet-alloy channels tied together such as shown in Figs. 87 and 88. Fig. 89 shows a typical tray made of sheet-alloy channels. If the assemblies are small, the trays are covered with grids such as shown in Fig. 90. Typical ratings in which roller-hearth copper-brazing furnaces have been built are 500, 900, 1500, 1900, and 2200 lb. gross per hour including the work and carriers.

The roller-hearth furnace permits great flexibility in its design because there are practically no limitations to its length, which renders it highly suitable for large-scale production. From a heating standpoint, it is economical to operate for brazing assemblies of light, medium, or heavy weight. Maintenance cost is low, because the rolls last several years as a result of the fact that they continuously turn and re-distribute their stresses, and the carriers have reasonably long life since they are free from any pulling or pushing stresses. Its operating cost can be quite low by incorporating automatic charging and discharging mechanisms, such as used on the furnace shown in Figs. 87 and 88, which makes the furnace practically self-operating. New possibilities for the use of electric-furnace brazing have been opened up by the roller hearth furnace, particularly in the automotive and refrigeration industries where high rates of production are encountered.

Gases Used for Atmospheres

Hydrogen makes an excellent atmosphere for brazing furnaces, as does also dissociated ammonia, which is 75 per cent hydrogen and 25 per cent nitrogen. The most commonly used gas for furnace atmospheres, however, is an inexpensive mixture formed by the partial combustion of natural gas, coke-oven gas, butane, or

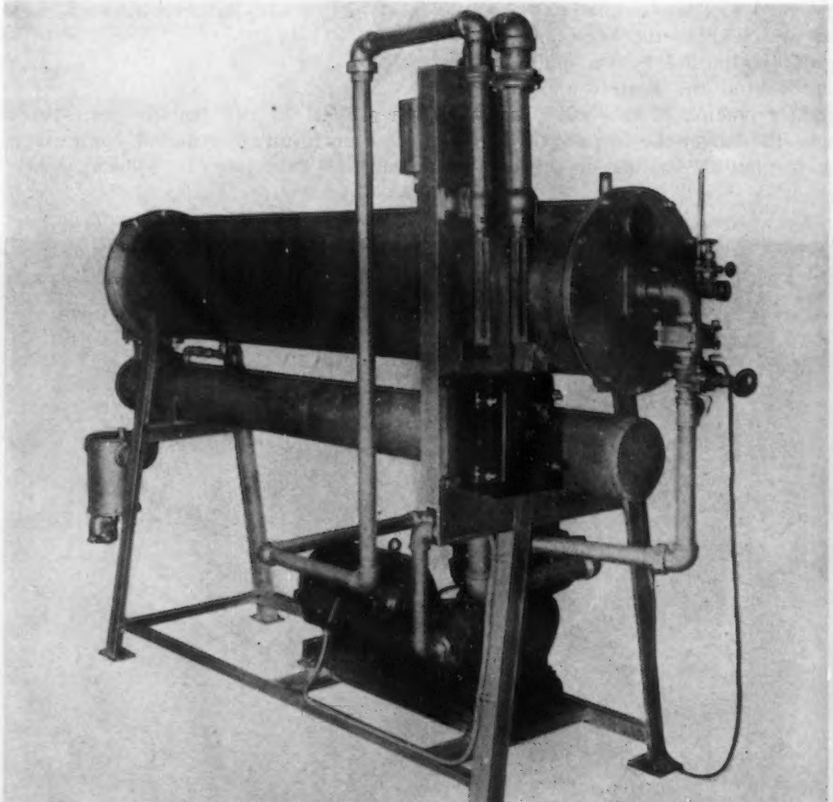


FIG. 91—This furnace-atmosphere controller supplies brazing furnace gases consisting of an inexpensive mixture of hydrogen, carbon monoxide, carbon dioxide and nitrogen. It re-forms coke oven, natural, butane or propane gas by partial combustion.

propane. This mixture contains about 20 per cent hydrogen, 12 per cent carbon monoxide (both of which give a reducing effect at 2100 deg. F.), 3 per cent carbon dioxide, and 65 per cent nitrogen. This gas costs only 10c. to 50c. per 1000 cu. ft., and produces very satisfactory results.

The machine illustrated in Fig. 91, in which the gas is processed, is called a combustion-type, furnace-atmosphere controller. The ingoing gas and air pass through visual flowmeters where the ratio and the rate of flow can be observed at a glance. The gas and air then enter a motor-operated mixer which positively controls the input ratio and pressure, and holds them constant regardless of the load. The gas-air mixture is then burned over a catalyst bed in a combustion chamber, from which the products of combustion pass through a surface cooler.

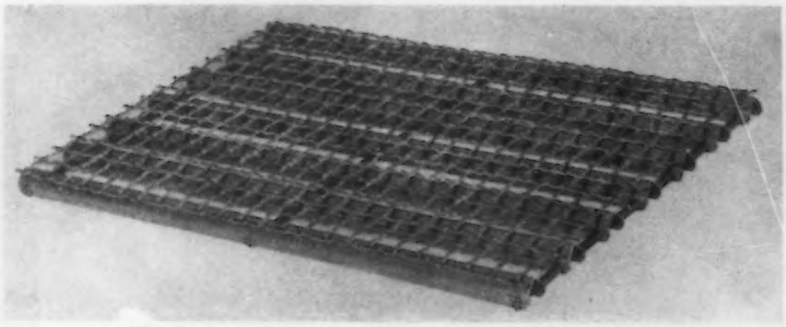


FIG. 90—Grid placed on tray to support small assemblies.

Here some of the moisture is condensed out before the gas goes to the furnace. In the heating and cooling chambers of the furnace the gas forms a protective atmosphere which prevents oxidation of the work, and encourages the brazing metals to wet and flow on the parts. Accessories are available for treating the gases as they leave the furnace-atmosphere controller, should special requirements dictate that moisture be further or completely removed, or the gases be otherwise purified, before they enter the furnace.

(TO BE CONTINUED)

Elasticity of Cast Iron Determined

AN optical method for measuring the deflection of cast iron transverse test bars up to the breaking strength has been developed by A. I. Krynitsky and C. M. Saeger, Jr., of the Department of Commerce. Deflection is determined by measuring the distance between a reference point and a rubber band mounted on the test bar, the deflection readings being independent of any movement of parts of the testing machine.

Using the above method, three types of cast irons have been investigated. The irons were heated to maximum temperatures of 2552 deg., 2732 deg., 2912 deg., and 3092 deg. F. Test bars 1.2 in. in diameter were cast vertically, bottom poured in green sand molds at 180 deg., 270 deg., 360 deg., and 450 deg. F., above the liquidus temperature. Transverse properties of the test bars were determined by interrupted loading and by direct loading up to breaking load.

From the data obtained the total, plastic, and elastic deflections, modulus of rupture, relative modulus of elasticity, total, plastic, and elastic resilience were determined for all test bars investigated. The load-elastic deflection curves are not straight lines for their entire lengths. The relative modulus of elasticity was, therefore, determined on the straight-line portion of the curves, and also at the breaking load.

In general, the lowest and highest elastic properties were observed for the maximum heating temperatures of 2552 deg. and 3092 deg. F., respectively. These properties showed a tendency to decrease with an increase of pouring temperature.

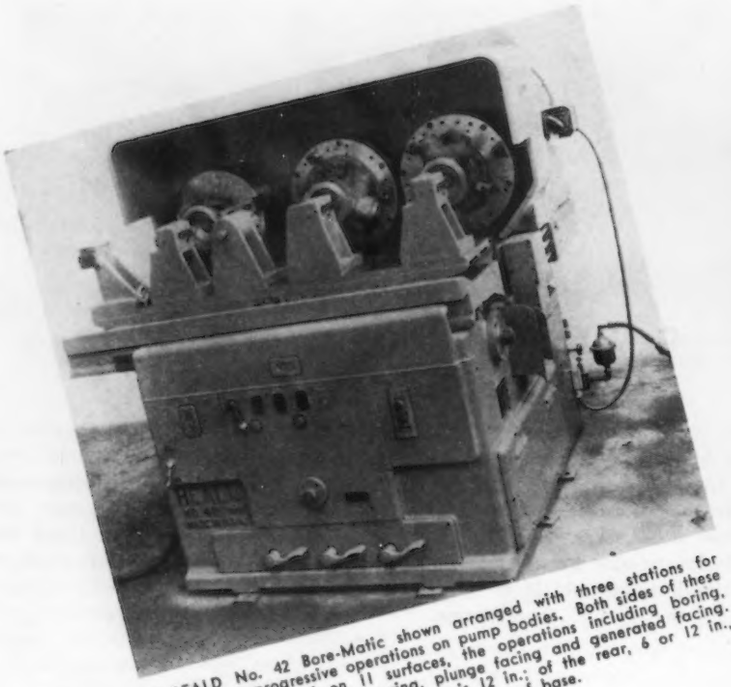
The microstructure of the test bars was examined. Comparatively fine graphite particles were discovered, which are associated with higher transverse properties. A laminated, pearlite-like structure observed on some unetched specimens and the presence of large graphite particles subdivided into hexagonal-like grains are of particular interest.

No Sticking of Weld Splatter with Coating

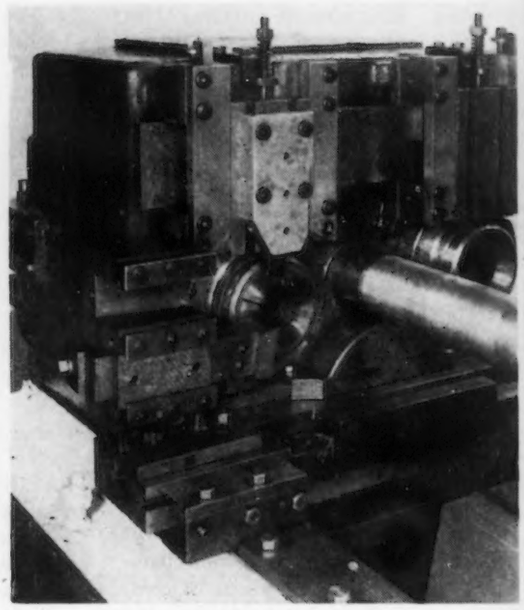
TO eliminate the necessity of grinding or chipping weld spatter from the metal surrounding a weld is the object of two new metal coatings, known as Flash - Ex and Spatter-Ex, sold by Wayne Chemical Products Co., Detroit. Both these compounds are soluble in water, and their application prevents the adhesion of spatter to either the part, dies or the welding holder jaws. After the welding operations have been completed, any spatter which might still be resting on surrounding flat surfaces is merely brushed off.

The Spatter-Ex compound is transparent and of light jell consistency. It is used on the part to be welded and is effective in either arc, flash or butt welding. The Flash - Ex compound, which is white and pigmented, is largely used with resistance welding to prevent the dies and welding holder jaws from becoming jammed with spatter, and with non-ferrous metals having greater heat conductivity than steel.

Both compounds are said to have been thoroughly tested in production use and are now being used regularly in axle plants, steel mills, steel drum manufacturers, auto body plants and in many other of the country's major industries.



HEALD No. 42 Bore-Matic shown arranged with three stations for multiple progressive operations on pump bodies. Both sides of these bodies are finished on 11 surfaces, the operations including boring, turning, grooving, counterboring, plunge facing and generated facing. Maximum travel of the front table is 12 in.; of the rear, 6 or 12 in., depending upon length of base.



CLOSE-UP view of the forming slide and newly added upper, cut-off slide on the improved Billings two-spindle Di-Matic bar stock automatic, now furnished in two styles, with indexing and non-indexing tool head.

Machine Tool Design Changes

INCREASES in size, range and adaptability have been made in nearly all classes of machine tools according to recent announcements of the manufacturers, the largest assemblage of such digested items published to date in these monthly reviews. Wider universality is featured in several machines, including a pre-

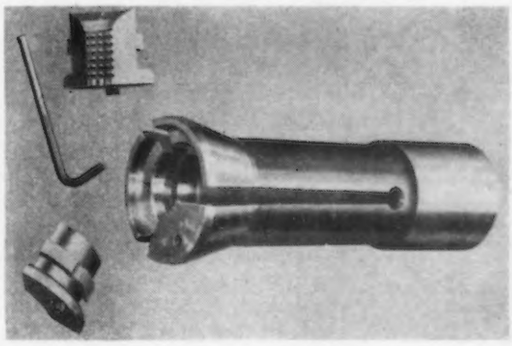
LATEST addition to the *Heald* line is the No. 42 Bore-Matic, a heavy duty, precision boring machine designed for multiple operations on comparatively large, heavy work. There are two hydraulically actuated table movements, at right angles to each other. The front table, which slides on ways parallel to the front of the machine, provides space for mounting either tool blocks or stationary work fixtures. The rear table accommodates the boring heads and their driving motors. These heads may be equipped with chucks for revolving the work, using the front tool blocks for generated facing operations or for boring. Movement of the front table also provides for indexing between stations.

Forward movement of the rear table provides the stroke for boring, turning, plunge grooving and plunge facing operations. Multiple operations can be performed on several different parts, or progressive operations on several similar parts. Both tables are actuated by separate hydraulic cylinders controlled by a single throttle but with independent control of feeds, infinitely adjustable. Both tables travel at a rapid rate to and from the work and for indexing.

Two-Spindle Automatic Bar Machine

A NUMBER of design changes have been made in the two-spindle Di-Matic automatic bar stock machine by the *Billings & Spencer Co.*, Hartford, since this company took over the manufacture from the Windsor (Vt.) Automatic Co. The most important change is the addition of an independent cut-off slide, placed over the non-indexing spindles and operated in the same manner as the forming slide. The arrangement permits removal of cut-off blades for regrinding, without disturbing the rest of the tooling set-up.

In the model A unit, with maximum capacity of 1½ in. round stock, the cylindrical turret has two tool stations. By removing the indexing turret and substituting a simple tool slide carrying two identical tool positions, one opposite each spindle, a higher production unit has been created, designated as Model B. It is made in two sizes, for 1½ and 2⅝ in. round stock. Forming slides are double tooled, and chucking and feed cams are arranged to feed through both spindles at once to a double stock

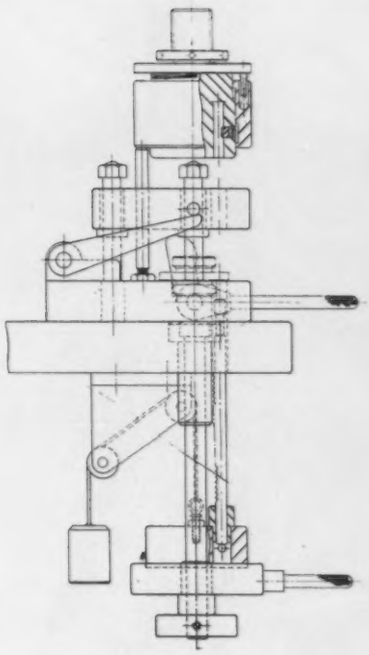


ABOVE

NATIONAL-ACME's new QC draw-in master collets and pads are designed to accommodate stock to the full capacity of all Acme-Gridley automatics employing such types of collets. Note the changed position of the holding screws.

ABOVE

COLLET pads can be completely changed in 5 min. in the perfected new Britain-Gridley master collets for bar stock automatics, now available in all sizes.



AT RIGHT

SPECIAL triple broach guide set-up designed for machining the slots for the synchronizer arms in Buick gear shift clutches. Broaches are pushed from the top and are guided both top and bottom, just above the machine platen. The lower holder shown is a counterbalanced receiver, which is lowered manually at the end of the stroke for the broach to clear the part and then raised to re-engage the push-pull head. The tooling is by Colonial Broach Co., Detroit.

Being Accelerated

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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cision boring unit that does many other operations besides and a tool room grinder that is capable of any conceivable movement to effect the grinding of intricate tool shapes at one chucking. Speed in changeover is exemplified in new quick change collet pads for automatic bar turning machines.

stop. On the model A machine, the collet opens and the stock is fed through alternately, one spindle at a time, during a dwell in the mid-point of the 180-deg. index.

Quick Change Collet Pads

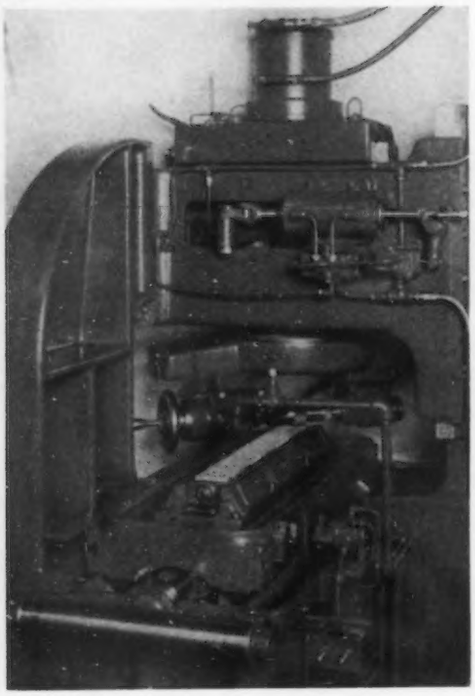
TO facilitate the quick change of collet pads on the new master collets for use on Acme-Gridley multiple spindle automatics, the *National Acme Co.*, Cleveland, has located the holding screw in the face of each pad. These screws may be loosened with a small hex socket wrench without having to hold the tube at the rear end or without removing the collet. A stop on the inner end prevents complete withdrawal of screws from the front, although they may be removed from the back side of the pads. A dovetailed shoulder on the pad tongue insures positive setting of each pad and maintains a bearing along the full radius of its collet section.

FRONT end location of the pad screws is also used in the new precision master collets offered by the *New Britain-Gridley Machine Division of the New Britain Machine Co.* The two screws are designed to slide the hardened and ground pad firmly into its seat against an undercut shoulder. Collet is made of special spring steel to give the proper spring tension required in releasing. A patented feature is the use of a round felt plug in each split of the collet to prevent coolant and chips from washing back to the collet seat. Further protection against chip entrance is also given by oil-resisting neoprene pants placed around the main body of the collet.

Surface Grinder

BALL tracks of hardened tool steel are employed to control the table, saddle and spindle column travel of a surface grinder being marketed for the first time by the *Taft-Peirce Mfg. Co.*, Woonsocket, R. I. Originally the machine was built for use in the company's own tool and gage divisions. The special way construction is said to assure uniform parallel and rectilinear motions, eliminating inaccuracies that may arise from variations in temperature, oil film and wear of the table and saddle ways. Ball bearings are also used for all rotating shafts.

The machine is compact in size, but



AT LEFT

CHIEF innovation in the improved rack-type gear finisher made by the Michigan Tool Co., Detroit, is a hydraulic mechanism for continuous oscillation of the gear-carrying arbor across the face of the rack while the rack itself is moving back and forth endwise, thus distributing the wear more evenly. This auxiliary hydraulic mechanism is interlocked with the machine controls. Length of stroke is adjustable as well as the speed of oscillation. A heavier and hence more rigid head construction is also incorporated, and the method of supporting head slides and work arbor has been changed for better balance over the center of the gear.

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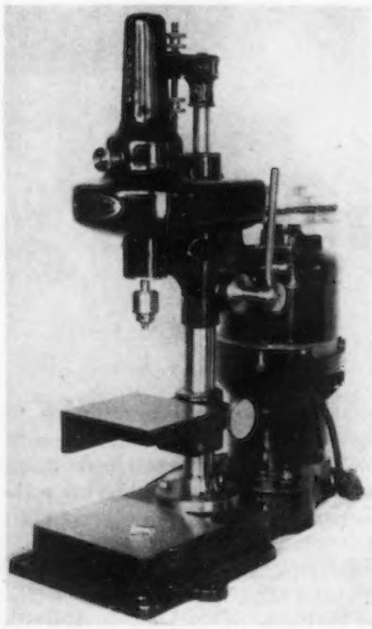
BELOW

A FOUR-SPEED precision, sensitive drilling machine, with a low speed of 750 r.p.m., has been added to the line of two and three-speed machines made by the High Speed Hammer Co., Inc., Rochester, N. Y. Range of drill sizes is from No. 80 to ¼ in. and the low speed enables tough alloy steels, like stainless, to be drilled. Top speed is 6000 r.p.m. for very small drills.



is built of heavy proportions. The spindle column is exceptionally heavy and is mounted so that the wheel may be adjusted for depth of cut with great precision. A unique mounting of the wheel spindle permits it to swivel in a vertical plane about the center of the wheel, thus simplifying set-up and adjustment and making it possible to finish surfaces with the angular face of the wheel as well as the periphery.

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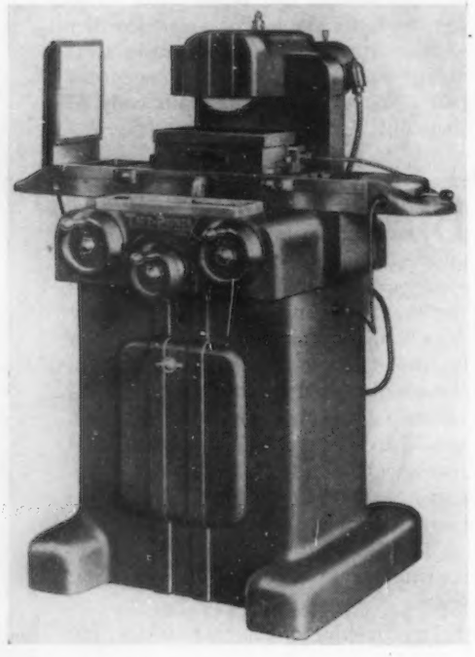
BELOW

PRACTICALLY frictionless table and spindle column travel is found in the Taft-Peirce surface grinder, now offered to the general trade. Capacity 5 x 12 in.; height under wheel, 12 in.



Plain Grinder

IDENTICAL in features to the Nos. 20 and 22 sizes in THE IRON AGE on March 10, 1938, p. 36, but larger in capacity is the No. 23 electrically controlled plain grinding machine, announced by the *Brown & Sharpe Mfg. Co.*, Providence. It has a capacity of 48 in. between centers as compared with 18 and 36 in. respectively on the smaller sizes. All three swing work 10 in. in diameter.

Thread Grinder

LIKE the 8 x 48-in. thread grinders now in wide use, the new 5 x 30-in. universal automatic thread grinding machine offered by the *Jones & Lamson Machine Co.*, Springfield, Vt., is designed around the automatic wheel truing device. Accuracy of thread angle is guaranteed within ± 5 min. on the half angle, lead to ± 0.0002 in. per in., with a cumulative error not to exceed 0.001 in. in 12 in. On production work the machine will grind threads automatically to a pitch diameter tolerance of 0.0005 in.

The grinding wheel spindle and its driving motor are mounted on a cradle to permit tilting the wheel to correspond with the helix angle of the thread. The wheelhead unit operates on roller bearings which ride between hardened and ground rails. Speed changes for the work spindle are made through sliding gears. Positive forward and reverse speeds are provided for two-way grinding of threads, and four independent rapid traverse speeds are provided for returning the grinding wheel to the starting position when grinding one direction only.

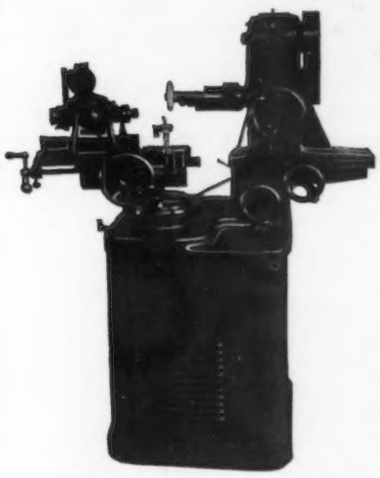
The adjustable tailstock includes a tungsten-carbide-tipped center. Adjustment is provided for grinding slight tapers by means of a graduated screw. Tapers or combinations thereof of more than a few thousandths are obtained by inserting hardened and ground formers, which directly control the action of the wheel slide and make it unnecessary to compensate for either lead or form on the grinding wheel. It is also possible to apply formers for automatically feeding the wheel in and out of cuts.

The machine is designed to feed in the grinding wheel automatically until correct size is reached. The wheel also is advanced automatically to compensate for decrease in its size after truing. The operator determines at what point of the cycle the truing should be done, also the amount to be dressed off. Three types of automatic wheel truing devices are available: Where only 60-deg. thread forms of slight helix angle are to be ground, a 60-deg. device is furnished. A universal wheel truing device with suitable formers will grind straight-sided threads, either symmetrical or buttresses of any included angle from 15 to 90 deg. The pantograph device, with suitable formers, will grind Whitworth, A.P.I. drill pipe or buttress threads with round top and bottom.

These truing devices are interchangeable between the 5 and 8 in. machines. The standard machine will grind single, double, triple, quadruple and sextuple threads, and includes pitch change gears for all pitches from 2 to 48 inclusive—a total of 33.

Tool Grinder

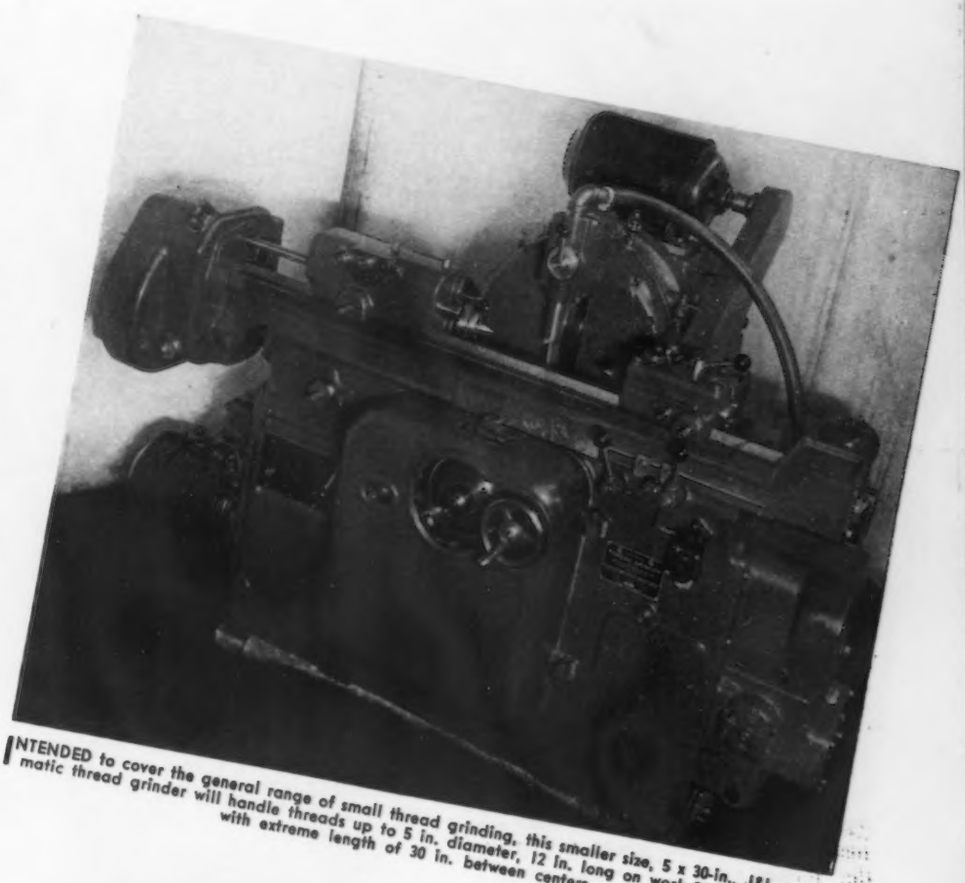
A FURTHER step in the direction of complete universality is found in the Monoset small tool grinder recently announced by the *Chittenden Corp.*, 5005 Euclid Avenue, Cleveland. The work head tilts 45 deg. above and below center, the turntable on which it is mounted is rotatable 220 deg. in a horizontal plane and the head has both transverse and longitudinal slide movement, including a helix generating motion. The work head



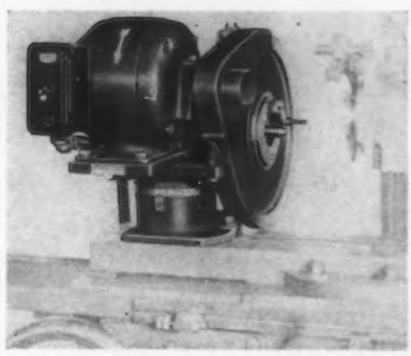
AS many as seven different surfaces, both external and internal, can be ground at one chucking of this model No. G4 S6 Monoset small tool grinder.

may be offset either side of center for decentric radius grinding or for internal or external grinding. Wheel head has sensitive vertical adjustment and may be fed transversely to the work, or the work fed to the wheel. For internal grinding provision is made for an auxiliary high speed (35,000 r.p.m.) spindle. All spindles are mounted on preloaded ball bearings.

With such a unit, it is possible to grind a wide variety of tools at a single setting. The operator need only establish the nodal points for any form he desires to grind from which all geometric forms are generated dimensionally. Many types of tools may be ground directly from hardened blanks. When reconditioning spiral tools, if the helix angle is unknown, the dial may be set approximately and the lead picked up by means of a work feeler.



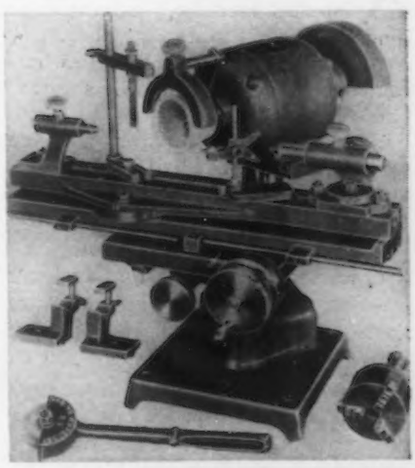
INTENDED to cover the general range of small thread grinding, this smaller size, 5 x 30-in., J&L automatic thread grinder will handle threads up to 5 in. diameter, 12 in. long on work 24 in. in length, with extreme length of 30 in. between centers.



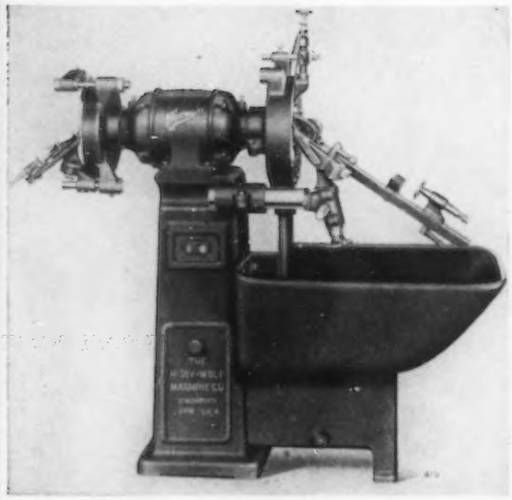
A WORK headstock driven by a ¼-hp. motor is now available as an extra on the No. 10 Brown & Sharpe cutter and tool grinding machine. Headstock swivels on its base and may be set 100 deg. either side of 0 by graduated scale. Base is alined on the swivel table of the machine by means of two tongues and is clamped by T-bolts. Standard equipment includes a 4-in. four-jawed independent chuck. Spindle speed is 300 r.p.m. Bearings are tapered bronze, with takeup.

Honing Machine Equipped with Electric Timers

MECHANICAL counters have frequently been used on honing machines to limit the number of strokes required to attain a desired finish. Recently, the *Barnes Drill Co.*, Rockford, Ill., applied two *General Electric* type TSA-10 process timers to a vertical honing machine for finishing automobile rear wheel hubs. A special multiple head with hydraulic cylinders



CUTTERS up to 5 in. diameter may be ground on this bench type machine made by the K. O. Lee & Son Co., Aberdeen, S. D. Wheelhead and compound table can be swiveled 360 deg., the latter being graduated in degrees and taper per ft. Motor carries a 6 in. wheel maximum.



ABOVE

TYPICAL of the new heavy duty wet drill grinders made by the Hisey-Wolf Machine Co., Cincinnati, is the type 3JJWD shown. It is supplied with 1 or 2-hp. motor, and has a small drill holder for straight or taper shank twist drills from No. 60 to ⅜ in. at the left and a holder for larger drills at the right. With the latter, the point angle can be varied from 37 to 70 deg. and the holder is of the universal type. Both holders support drills in V-guides. Coolant pump is self-priming, and a separator is provided to remove the grit before recirculation of the water.

over each spindle is used with adjustable valves and gages to actuate the honing tools. The two electric timers control the honing cycle, including the expansion and contraction of the hydraulic tools. The fixtures are operated by hydraulic cylinders under each position and a bridge-type hone-guide bracket carries two guide bushings. This particular machine has a production capacity of 150 parts per hour.

Crankshaft Lapping Machine

AN entirely hydraulic crankshaft lapping machine, designated as model B, has been designed by *A. P. Schraner & Co.*, Cleveland. Push button control is used instead of separate hand levers for each lapping head. This machine uses paper abrasive tapes, carried in 50-yd. rolls, with automatic mechanism for feeding in new paper so that each crankshaft is lapped under identical conditions. The hydraulic arrangement for applying pressure on the tapes and oscillating them permits greatly increased speeds of rotation and oscillation, as well as increased pressure. These features result in increased production and a degree of finish never before obtained with this method of finishing. The method also insures finishing to the extreme ends of the bearings, and when required adjustments can be made to include the fillets. Production varies from 45 to 60 shafts per hr., depending upon the conditions.

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BELOW

A FLOOR type model of its profile grinder is announced by Boyar-Schultz Co., 2124 Walnut St., Chicago. Wheel operates at 10,000 r.p.m., driven through a 2-hp. ball bearing motor. The machine is somewhat similar in construction to the portable type introduced last year.

Light Vertical Miller

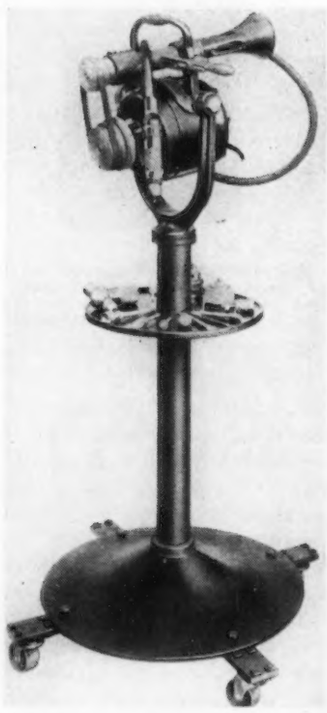
TO its line of light type millers, *Brown & Sharpe Mfg. Co.*, Providence, has added the No. 2 vertical, a completely mechanical drive with power fast travel. Table, which has a working surface of 10 x 45 in., is screw driven, with 16 changes of feed independent of the spindle speed. Power fast travel for longitudinal, transverse and vertical movements is available in either direction at the rate of 76 in. per min. Automatic feed is also provided in three directions.

Spindle head swivels 90 deg. in either direction in a vertical plane, and the spindle itself has 3 in. axial movement. It is mounted on anti-friction bearings and 16 speed changes are provided in practically geometric progression from 55 to 1800 r.p.m. Main drive is by a 3-hp. flange mounted motor, with separate ¾-hp. motor for rapid traverse movements of the table.

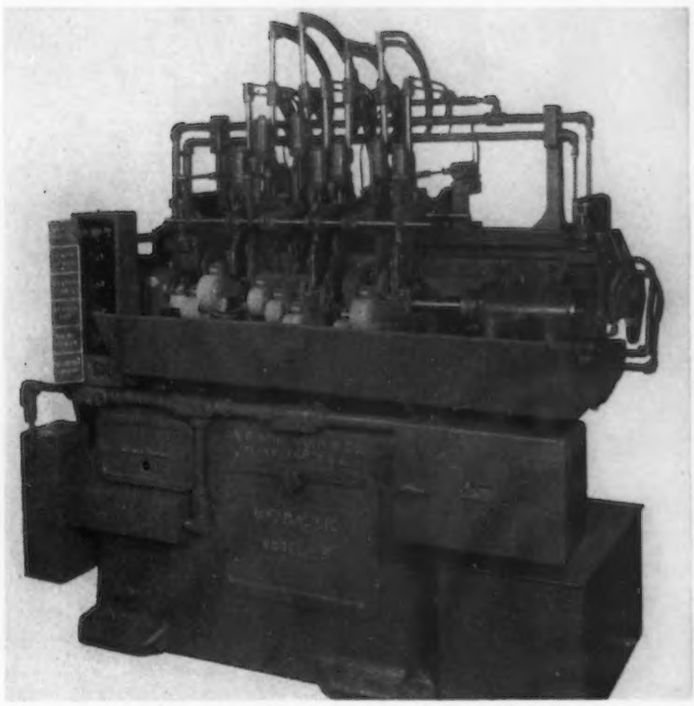
Automatic Indexing Machine

THE improved No. 5 automatic indexing machine made by the *Millholland Sales & Machine Co.*, 1115 East 35th Street, Indianapolis, can be supplied with vertical multiple spindle and also with horizontal heads on either side. The vertical head can be equipped with from 1 to 12 or more spindles and operations such as deep-hole drilling can be performed in steps. The horizontal units can be tooled with multiple spindles for such operations as cross drilling, reaming, milling and facing. The machine is sensitive enough to drill ⅛-in. holes and powerful enough to handle 1½-in. drills in steel.

The entire machine is controlled from the vertical unit, which times all operations. The frequency of indexing is set by change gears. An 18-in.



THE new multi-speed floor type Motor-flex unit made by the Martindale Electric Co., 1347 Hird Avenue, Cleveland, is available in three general types: ¼-hp. motor with light duty shaft; 1/3-hp. motor with medium duty shaft, and ½-hp. motor with heavy duty shaft. The hinged construction of the jackshaft permits rapid adjustment of belt tension and quick change of pulley speeds. This line was formerly made by the Hergi Mfg. Co.



ABOVE

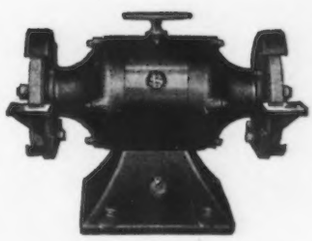
ONE of a battery of nine model B hydraulically actuated crankshaft lapping machines recently furnished the Ford Motor Co. by A. P. Schraner & Co. for lapping all main and throw bearings simultaneously.

diameter index table is regularly supplied, and many compact designs of work holding fixtures are available. Cutting time is 70 per cent of the cycle, the remainder being used for rapid approach of tools to work and rapid return, also indexing. A number of mechanical safety features are incorporated to protect the machine.

Contour Sawing Machine

A NEW type of saw guide said to hold back the saws more securely and closer to the work both below and above the work table is found in the model V-36 DOALL contour sawing machine, latest design of the *Continental Machine Specialties, Inc.*, 1301 Washington Avenue South. Minneapolis. Greater flexibility, more sensitivity and higher speed range adapt this machine to wide use in shape cutting outside of strictly die work. The improved machine is massive, has a 36-in. throat and 10 in. work height capacity. It is built of arc welded steel. Work table tilts in four directions, is 30 in. square and 2½ in. thick.

A 1-hp. motor drives the machine first through Speedmaster variable-pitch sheaves and then through a helical gear transmission. Speed range is from 0 to 1500 ft. per min., read on a tachometer. Ball bearings are used throughout. Regular equipment includes welder and flash grinder, magnifying glass, air jet for chip removal, 20 saws, two file bands and three polishing bands.



ABOVE

MOTOR is a totally enclosed capacitor type in this new Skipper 6-in. bench grinder, made by the United States Electrical Tool Co., Cincinnati. Rated at ¼-hp. at 3400 r.p.m., the unit weighs only 45 lb. Rotor is dynamically balanced. Comes equipped with one fine and with one coarse grinding wheel, 6 in. in diameter and ⅝ in. face.

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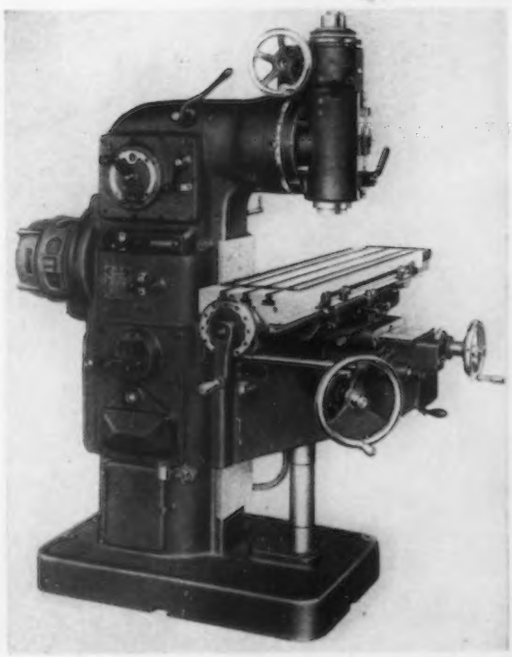
Turret Lathe Developments

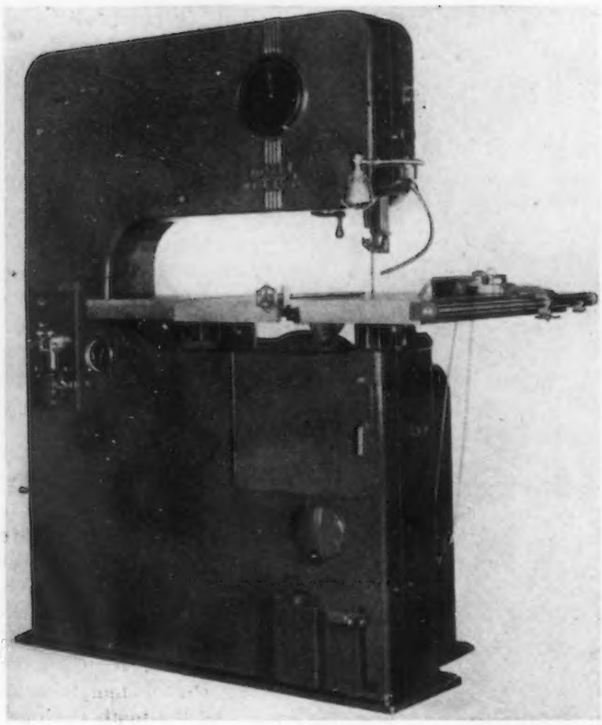
MANY refinements in design have been made in the Nos. 1L, 2L and 3L high production turret lathes built by *Gisholt Machine Co.*, Madison, Wis. The 3L is a new and larger size. Bar capacities now range from 2½ to 4½ in. in diameter and from 36 to 48 in. long, and the machines mount chucks ranging from 12 to 21 in. in diameter. High carbon alloy steel ways, hardened throughout, are straddle keyed to the bed and are ground in alinement with the spindle mount. Spindle is mounted on precision tapered roller bearings, and all shafts in the headstock are on anti-friction bearings. Gears are made of high carbon, chrome-molybdenum steel, hardened and the tooth contours ground. High speed gears are the helical type. Headstock have 12 speeds, all arranged in geometrical progression.

Feeds and rapid traverse are controlled at each carriage independently of each other. Sixteen reversible feeds are provided for both longitudinal and cross feeds of the cross slide or the cross feeding of the hexagon turret, if desired. Large graduated feed dials assist in working to close dimensions. Rapid traverse is



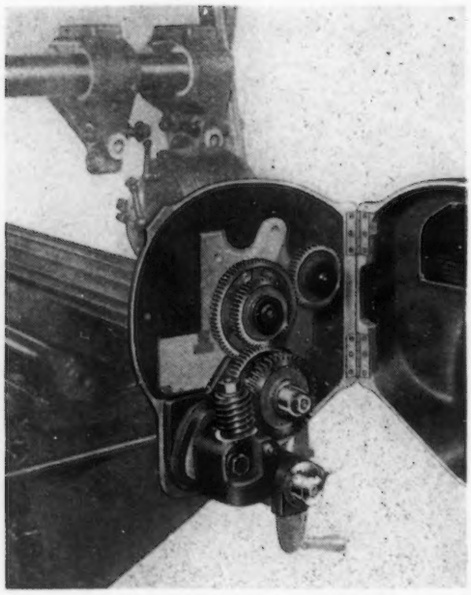
AT RIGHT

FAST travel of table in any direction of feed is given by a separate ¾-hp. motor in this No. 2 vertical unit recently added to Brown & Sharpe's line of light type millers.



ABOVE

MODEL V-36 Continental DOALL has been developed to handle all kinds of contour sawing beyond the limited application to die work.

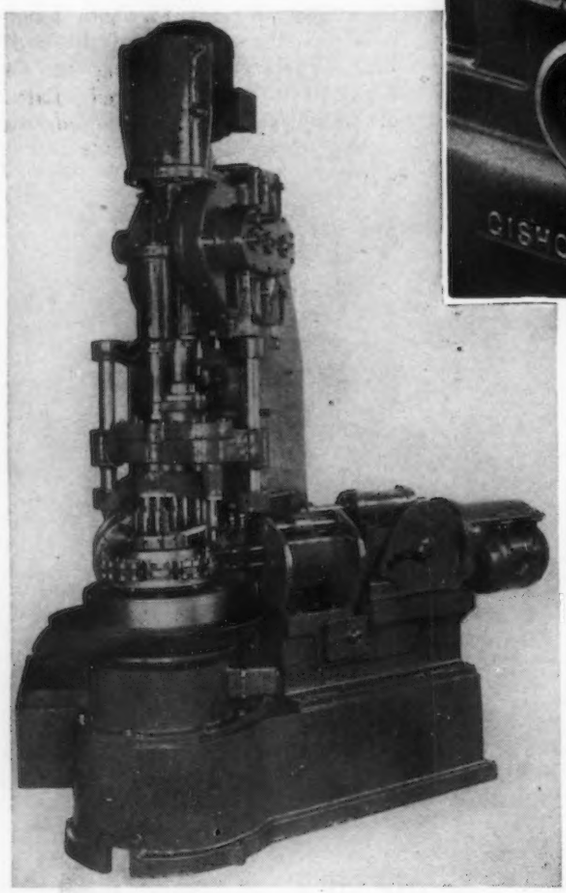


ABOVE

NO. 20 short lead attachment for Brown & Sharpe No. 2 light type universal milling machines when used in connection with change gears as shown provides for cutting leads as short as 80 turns per in. In slightly modified form, the unit may also be used as a feed reducing attachment, spiral change gears providing longitudinal feeds of 1/20, 1/200 and 1/400th of the normal rate. Also illustrated is the new aluminum alloy guard covers, which may also be had for covering the regular change gear drive to universal spiral index center.

ABOVE

DIRECT, pre-set and high-low automatic speed changing is made possible with this power operated attachment available to increase the efficiency of Gisholt ram type turret lathes.



AT LEFT

A NUMBER of features have been added to the No. 5 Millholland indexing machine, making it adaptable for a combination of operations, such as drilling, countersinking, reaming, boring, facing, tapping and milling.

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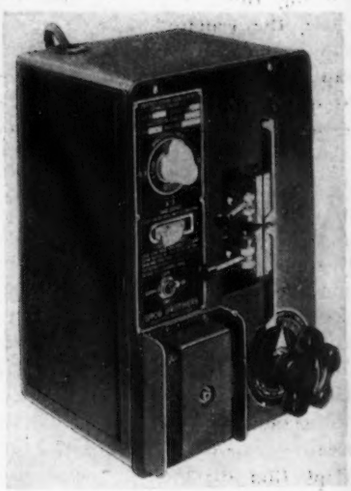
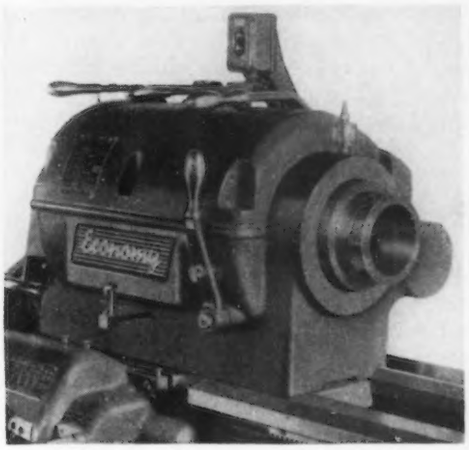


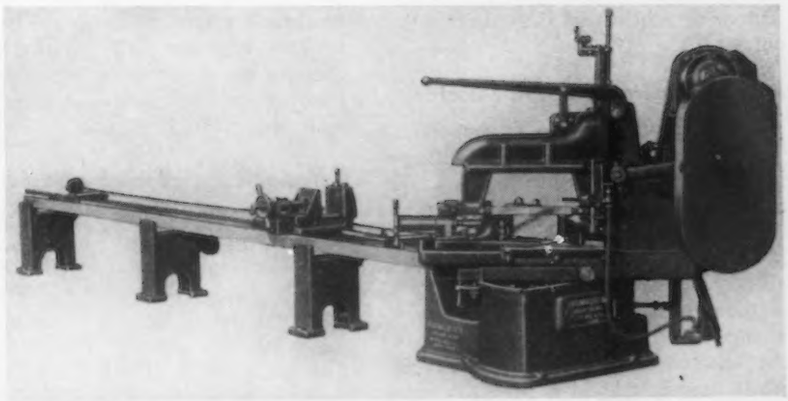
ABOVE

FOR joining metal cutting band saw blades from 1/16 to ¼ in. in width, used in contour sawing machines, Grob Brothers, Grafton, Wis., is now offering the type BW electric butt welder shown. Saw blade clamps are designed to permit positive and accurate line-up of the saw blade, with full electrical contact. Only the flat part of the blade is in the clamp, which is actuated by an eccentric. Welding and annealing is timed automatically. At lower left is a built-in grinder with ball bearing motor and bakelite bonded wheel for removing the flash.

BELOW

FOR work on tubing where the cuts are relatively light but the diameter is large, the Rockford Machine Tool Co. has built a new headstock for its standard 16-in. Economy lathe, equipping it with a hollow spindle of 4 in. bore. With drive pulley speed of 385 r.p.m., the headstock has speeds from 15 to 296 r.p.m., representing a slight decrease in maximum speed as compared with the standard head. Timken bearings are used on spindle and drive train.

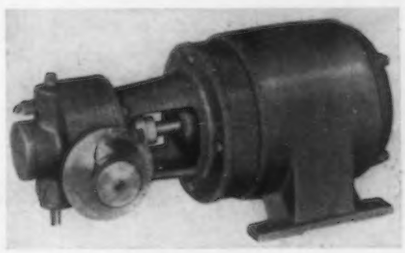




MULTIPLE cutting operations either straight or at any angle up to 45 deg. can be performed by this new automatic metal cutting power hack saw machine, made by the Rasmussen Machine Co., Inc., Racine, Wis. Feed can be regulated in 1/32 in. steps from 0 to 24 in. The swiveling construction of the head makes it possible to install the equipment against a wall or alongside an aisle, desirable when cutting long bars.

AT RIGHT

MODEL 24M Di-Saw, made by the Tannewitz Works, Grand Rapids, is a simplified machine for continuous sawing and filing, either inside or outside. Machine, of welded steel construction, incorporates a two-speed drive motor and a variable speed mechanism, with handwheel control and a tachometer. There is an adjustable pressure mechanism for feeding the work into the saw, as well as a hand screw feed. A conventional butt welder with capacity for joining blades up to ½ in. wide is standard equipment. Chip blower and magnifying glass are included.



ABOVE

A FEATURE of the Denison variable volume hydraulic pump is that it will automatically deliver its maximum volume for rapid traverse when it is not working against the load.

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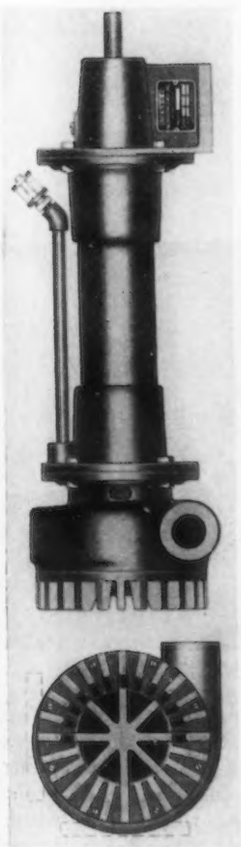
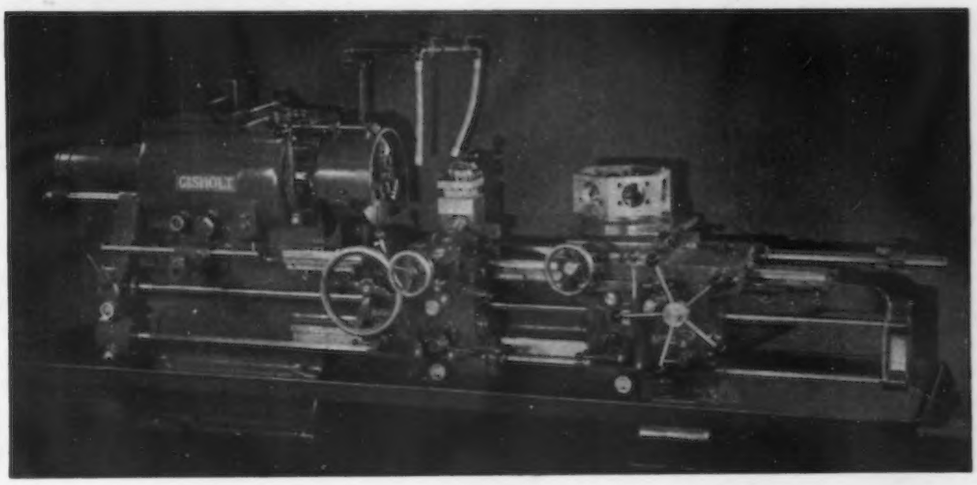


ABOVE

PIONEER model FB-V coolant pump is designed to be submerged directly into the tank or reservoir and suspended by the foot bracket. Various other types of mounting are supplied for these indirect drive types especially designed for foreign service where the motor characteristics differ from American standards.

BELOW

RAPID traverse levers for the longitudinal travel of both carriages and the cross slide are provided with colored knobs for convenience of the operator on the improved Gisholt series L high production turret lathes. The 2L size is shown. A 3L machine has also been added to the line.



also provided for these same motions. Automatic lubrication is used throughout.

Power Operated Speed Selector

GISHOLT has also announced a selective automatic speed changing device for use on its Nos. 3, 4 and 5 ram type turret lathes. Shifting of the gears in the headstock is effected by oil hydraulic power. Three operating arrangements include a direct method in which spindle speeds are changed by turning the handwheel to the selected speed with the left hand while the right hand is used to index the turret; a preset method by means of which the spindle speed for the next cut can be selected in advance of indexing; and a high-low combination for use in shifting from drilling to threading, etc.

The preselector dial is in the form of a slide rule, allowing the 12 spindle speeds from 28 to 730 r.p.m. to be selected to correspond to the diameter of work and the desired cutting speed, ranging on the scale from 40 to 600 ft. per min. The compound dial is located on the front of the headstock where it can be easily read by the operator. All spindle speed changes are made while the spindle is rotating and without releasing the main drive clutch.

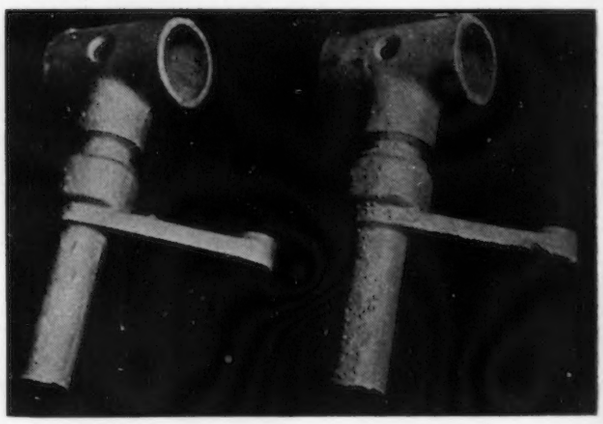
Variable Speed Hydraulic Pump

ORIGINALLY designed for use in ceramic kiln drive but applicable to machine tool circuits is a new, small variable volume hydraulic pump just announced by the *Denison Engineering Co.*, 236 N. Water Street, Columbus, Ohio. Control dial allows a minimum discharge of 5 cu. in. per min. The three-piston pump body and the rotary valve are combined in a single shaft made of heat treated tool steel and mounted on anti-friction bearings. Unique feature is a rapid traverse or quick take-up which permits the pump to deliver its maximum volume when it is not working against the load or against a light, predetermined load. By means of an adjustment in the barrel, this load can be established by setting the pressure at which the pump will stop delivering maximum volume and deliver the volume indicated on the control dial. The same control can be arranged as an overload feature.

Coolant Pumps

A NEW series of coolant and lubricant pumps has been designed by the *Pioneer Engineering & Mfg. Co.*, 31 Melbourne Avenue, Detroit, for use in conjunction with machine tools or auxiliary tanks where the unit must be driven by belt, chain or flexible coupling. They are particularly adapted for export shipment because of the variations in motor characteristics met with in foreign service. Model FB-V illustrated and model FV are designed to be submerged directly into the reservoir and to be attached to the side of the tank or machine. Model F-VB is a more compact type for pedestal mount in close coupled installations. All of these units are built in capacities up to 175 g.p.m. and pressures up to 53 lb. per sq. in. Impellers are of the open type. A special mechanical seal is used on the shaft, eliminating the need for repacking.

Hot Galvanizing Malleable Iron



IN a number of hot galvanizing plants there has been a tendency to reduce the use of muriatic acid and sal-ammoniac as a fluxing combination in favor of zinc-ammonium-chloride of some type, as for instance No. 20 flux, according to Hanson-Van Winkle-Munning Co.

Zinc-ammonium-chloride dissolved in water replaces the muriatic acid and is popularly referred to as a "neutral flux wash." Such a solution conducts electricity (is an electrolyte) and therefore should be kept preferably in a wooden tank to avoid contamination. The crystalline zinc-ammonium-chloride is used directly on the molten zinc to replace sal-ammoniac.

The results from the chloride are smooth, ductile and adherent, and dross production is quite low. The elimination of muriatic acid ends the introduction of large quantities of iron chloride into the galvanizing kettle and provides an opportunity to remove hydrogen absorbed by the work while being pickled.

The accompanying illustration shows two malleable iron castings from the same batch of work, pickled simultaneously and rinsed together. Then the casting shown on the left was dipped in a special hot, concentrated flux wash for several minutes before placing in the molten zinc. The casting on the right was given a regular acid wash treatment, consisting of a muriatic acid dip, a rinse, drying on a hot plate and then going through fused sal-ammoniac into the molten zinc. The rough spots which are clearly visible, many being distinct craters, were caused by hydrogen acquired in pickling escaping from the casting when it first touched the hot molten zinc. This conclusion is said to be confirmed by repeated tests on various steel and cast iron products by the Hanson-Van Winkle-Munning Co.

39th Acetylene Convention Reviews Welding, Cutting In Oil Industry, Elects H. B. Dolisie

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By RALPH E. MILLER
Machinery Editor of The Iron Age

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HOUSTON, Tex.—Welding and cutting in petroleum production, distribution and refining were comprehensively reviewed at the 39th annual convention of the International Acetylene Association, held March 8, 9 and 10 at the Rice Hotel, Houston, Tex.

In addition to five technical sessions at which 17 papers were presented and discussed, the convention featured a short forum-demonstration followed by simultaneous informal group meetings at the San Jacinto high school. Attendance was of record proportions. H. C. Boardman, research engineer, Chicago Bridge & Iron Co., and president, the American Welding Society, was chairman of this session. Demonstrations included flame hardening, hard facing, and oxy-acetylene welding of oil well casing. Group discussions covered oil well casing welding, safe-ending of boiler tubes, testing of welds, salvaging and reclamation, hard-facing, flame-hardening, fire prevention and safety, alloy steels, and non-ferrous metals.

An inspection trip to the Hughes Tool Co. was arranged for the morning of March 10.

Election of officers for the coming year resulted in naming of H. B. Dolisie, managing director, Canadian Liquid Air Co., Ltd., Montreal, president, and Henry Booth, Shawinigan Products Corp., New York, vice-president and treasurer. H. F. Reinhard, engineer, Union Carbide Co., New York, is secretary.

The 1937 Morehead medal was presented to John J. Crowe, manager, apparatus research and development, Air Reduction Sales Co., New York, at a luncheon meeting which opened the convention. The presentation was made by C. D' W. Gibson, vice-president, Air Reduction Co., and a past president of the association.

Editor Pictures Threats to U. S.

Following a gracious address of welcome by J. W. Evans, vice-president, U. S. Chamber of Commerce, and chairman, Port Commission of Houston, J. H. Van Deventer, editor, THE IRON AGE, delivered the keynote address on "What Goes On Here?"

Two powerful factors, one domestic and one foreign in origin, are threatening the future of American enterprise, said Mr. Van Deventer. One of these, the American factor, is the anti-machine complex; the other is the totalitarian movement, he said.

"If American industry does not soon wake up to the importance of presenting the constructive employment-building effect of progressive technology to the American public, it may shortly experience a nightmare," he said.

An interesting outline of the beginnings and growth of the acetylene industry and of the I. A. A. which was organized in 1897, was given in the presidential address of Elmer H. Smith, president, Commercial Gas Co., Minneapolis, who presided at the opening session. Judging the future by the past, the years to come undoubtedly will hold far-reaching developments, he said.

In addition to the election of officers and reports by a number of the association's committees, the annual luncheon and business meeting featured an address by George A. Hill, president, Houston Oil Co., and vice-president, American Petroleum Institute.

Year's Program Outlined

The progress made in the oxy-acetylene industry in the past year was outlined in a report of the association's oxy-acetylene committee.

Increased acceptance of the process as one which warranted a permanent investment in the form of pipe lines to distribute oxygen and in some cases

acetylene from central locations to all consuming points was emphasized as one feature of the year.

New multiflame tips were said to have resulted in increased speed of overland pipe welding, although not confined to such pipe line work.

Developments in machine cutting have been along two lines, namely, increasing the range and versatility of cutting machines, and the development of new procedures for these, as well as for the larger stationary machines.

Use of flame hardening was said to have greatly increased, and flame softening was emphasized as another example of the trend toward more efficient heat utilization by means of multi-flame heads. Use of the oxy-acetylene flame for straightening, bending, forging and forming operations has expanded rapidly.

In hard surfacing, a prominent trend was said to be the complete standardization on this process by oil field operators. New designs of inserts meet practically all drilling bit requirements for oil and water wells.

Producing Hard Surfaces On Steel

An instructive lecture on "Surface Hardening and Hard Surfacing" was delivered by C. E. MacQuigg, dean, College of Engineering, Ohio State University. Discussion was led by the chairman, Dr. A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories, Inc., New York, and participated in by John J. Crowe, manager apparatus research and development, Air Reduction Sales Co., and Ernest E. Thum, editor, *Metal Progress*, Cleveland.

Lecture Is First of Series

Dean MacQuigg's lecture, which marks the first of a series of annual lectures to be given by the association, included brief discussion of wear, methods of controlling surface hardness, and factors to be considered in selecting any hardening method, including hard-facing. Flame hardening methods and applications were discussed and data were given on selecting suitable steels for flame hardening.

Discussion of hard surfacing or "hard-facing" formed a generous portion of the lecture. The four broad groups of hard-facing alloys, namely, low-alloy steels, high-alloy steels, nonferrous alloys, and tungsten carbides, were described and data were given on the selection of the correct material for particular applications.

"In the oil industry, it is interesting to trace the parallel development of the hard-facing process and oil-well drilling tools—tools of more intricate design and made of better materials," said Dean MacQuigg. "Such intricate tools as are available today would probably never have been feasible without the extra long life imparted to them by hard-facing materials."

OFFICERS and guest speakers at the opening luncheon of the 39th annual convention of the International Acetylene Association held at Houston, Texas, last week. In this picture are, from left to right: H. F. Reinhard, secretary of the association; C. D. W. Gibson, past president; W. A. Sherman, president, Magnolia-Airco Gas Products

Hard Facing of Drill Bits

A paper on "Oxy-Acetylene Application of Hard Facing Materials to Oil Well Drilling Bits" by C. H. Shapiro, chief metallurgist, Reed Roller Bit Co., Houston, was an outstanding contribution at another session.

Prior to 1923, drilling bits of the soft formation type were redressed by the forging method. The trimming and shaping of the cutting edges resulted in waste of material that severely shortened the overall life of the bit.

Early attempts at surfacing fishtail bits with an acetylene torch were made by applying cast iron, tool steel, etc. Further developments produced the metals in general use today, which, it was stated, can be considered eminently successful. Advantages from a welded-on overlay were said to be greater dependability, longer life and increased footage drilled.

Acetylene application of homogeneous type hard surfacing rods (made by combining chromium, tungsten and cobalt) was described by Mr. Shapiro. Following this type of rod came the introduction, in 1927, of tungsten carbide. Despite its high cost, the advantages in its use became apparent. Of the various forms of this material developed later, the most important was the filling of thin-wall tubes or sheaths with crushed or graded particles of this metal. In application it was found that the tube could be handled as easily as an ordinary welding rod and that the metal of the tube acted after deposition as a binding material, fusing itself to both the base material and the tungsten carbide. Composite or amalgamated rods act similarly. These rods are made by previously melting low-carbon steel on to graded, crushed tungsten-carbide granules so as to form a rod or stick.

First Applied as Slugs

The cast, rather than the sintered, tungsten carbides are used as hard surfaces for the cutting edges of earth-boring tools. Early application of this carbide was in the form of inserts or slugs. These were set on to the cutting blades and covered with some type of homogeneous material. Today this metal is applied in two

Co., and of the South Texas Cotton Oil Co.; J. H. Van Deventer; E. H. Smith, retiring president; J. W. Evans, chairman, Houston Port Commission; H. B. Dolisie, president-elect of the association; John J. Crowe, who received the 1937 Morehead medal; and Henry Booth, vice-president elect and treasurer of the I.A.A.

forms on the same bit-cutting wing. Inserts are set partially into the base material surface after melting a spot or grinding a groove to accommodate them. After setting, the inserts and surface adjacent are covered with tube or composite metal.

Steps in the building-up of worn blades were described and illustrated. As to new fishtail bits, or detachable welded-on blades, they are hard-surfaced by a standardized procedure. The paper also briefly covers soft formation core bits, rock bits, hard formation core bit heads, slush tubes, disk bits, and cable tool bits.

Oil Well Casing Gas Welded

A paper on "Gas Welding of Oil Well Casing," by R. Milton, shop foreman, Sinclair Prairie Oil Co., Arp, Texas, gave data on the welding of several hundred miles of surplus pipe which it was desired to use for oil well casing and which could not be converted into screw pipe. Utilization of this pipe at minimum expense led to the adoption of the welded method of oil well casing. The bulk of the pipe used by the company for casing by gas welding is 6⅝ in. O.D. About 200 oil wells have been cased by this method in the East Texas field by the company.

F. C. Hutchison, Linde Air Products Co., Kansas City, Mo., in a written discussion, pointed out that in the East Texas operation of Mr. Milton's company, in which line pipe was utilized for their well strings, the pipe metal was grade B, which is sufficiently low in carbon content and ultimate strength that they felt reasonably confident of attaining practically 100 per cent joint efficiency.

Two Problems Presented

Casing pipe today is of very high physical strength, the high strength being obtained by use of a high percentage of carbon or by the alloying of certain elements such as copper, manganese, etc., Mr. Hutchison said in another part. These higher carbon and low alloys present two problems: (1) weldability, as the carbon is higher than what has been considered in the past as an acceptable maximum value, and (2) accelerating the cooling down of the completed weld without seriously and injuriously affecting the structure and properties of both the weld metal and the adjacent base metal.

In a review of progress made in the pipe line field, W. B. Poor, engineer, United Gas Pipe Line Co., Houston, reported three major phases of advancement. These are (1) improvement in welding facilities, with particular reference to tips and rods; (2) field stress relieving of arc welds with the oxy-acetylene flame; and (3) development and wide acceptance of "wrinkle bending."

In improved welding facilities a comparatively new 4-flame tip for bell-hole or position welding; a 6-flame tip for double-jointing pipe and for roll welds; and a low-alloy steel rod should be of particular interest, it was said, to pipe line operators. Data on wrinkle bending, together with its advantages, were given by Mr. Poor.

Oil Field Equipment Maintenance

Increasing demand of the oil producers for deeper wells and faster drilling necessarily calls for the most up-to-date methods in oil field work, said C. G. Alhart, welding supervisor, Texas Iron Works, Houston, in a paper on "Maintenance of Oil Field Equipment." When the drilling equipment is moved in on location, a field welding truck is among the first equipment to be called upon, and is in constant demand until the entire rig is set up and in operation. After actual drilling operations start, should the rig break down, the field welding truck is again called upon to make emergency repairs.

Improved Welding Fittings

New developments in welding fittings were outlined by E. Hall Taylor, vice-president, Taylor Forge & Pipe Works, Chicago, at a session devoted to welding and cutting in petroleum refining. Of first importance from the users standpoint is the new "Proposed Standard for Welding Fittings," he said. This covers the overall dimensions of the fittings in elbows, tees, caps, reducers, return bends and lap joint stub ends. It also covers the pressure ratings size, marking, material, metal thickness, tolerance and welding bevel.

The angle of the bevel for butt welding has been agreed on, 37½ deg. The narrow groove formed by this bevel requires less weld metal, thus saving time and material. The design of the hub on butt weld flanges has been improved to eliminate danger of the heat of welding warping the face of the flange.

A new welding fitting designed to lower the cost of welded low pressure installations has been developed, as well as a fitting having an integrally forged centering ring which facilitates lining up the fitting so that it is concentric with the pipe end.

Welded high-pressure piping—pipe

½-in. thick and greater—was discussed by A. N. Kugler, mechanical engineer, Air Reduction Sales Co., New York.

Procedure for oxy-acetylene welding of high-pressure piping requires first the selection of a suitable welding technique, second the use of a suitable welding rod, and finally the determination of a proper stress relieving or heat treatment method to assure a minimum of locked up stresses, he said. Current methods of achieving these were outlined in the paper.

ELMER H. SMITH, president, Commercial Gas Co., Minneapolis, and retiring president of the I.A.A., in conversation with J. W. Evans, chairman, Houston Port Commission and vice-president U. S. Chamber of Commerce, during the opening luncheon of the association's convention held at Houston, Texas, last week. Mr. Evans made the address of welcome.

Safe Ending Boiler Tubes

The system by which safe ending of boiler tubes by fusion welding is controlled in California was described by Frank Page, supervising engineer, boiler section, California Industrial Accident Commission, San Francisco. Before welders can safe end by welding, they must satisfy the commission that they can make sound and ductile welds. They are then given a permit and a number, good for one year, except when they go with another employer, or if they change the process or rod. They are required to place their number on each weld so that there will be no confusion in placing the blame in the event of failure.

Applications of the oxy-acetylene process in oil refineries were described at length by Henry Jouette, general welder foreman, Magnolia Petroleum Co., Beaumont, Texas. His paper covered typical applications in new construction and maintenance and in salvaging operations.

Two meetings, each with three technical papers, featured the closing day of the convention. One session was devoted to oxy-acetylene cutting, and the papers were as follows: "Flame-Cutting with Small Machines," by Walter B. Van Wart, vice-president, Wyatt Metal & Boiler Works, Dallas; "Oxy-Acetylene Shape-Cutting of Drilling Equipment Parts," by L. W. Stahl, plant manager and chief engineer, Emsco Derrick & Equipment Co., Houston, and "Economics of Machine Gas Cutting," by G. M. Deming, research engineer, Air Reduction Sales Co., New York.

Papers at the other meeting, devoted to general applications, were: "Plumbing, Heating and Air Conditioning," by Frank Wallace, C. Wallace Plumbing Co., Dallas; "Flame-Hardening of Oil Field Equipment," by Michael O'Hara, production manager, International Derrick & Equipment Co., Beaumont, and "Agricultural Uses of Welding and Cutting," by M. H. Byrom, Agricultural and Mechanical College of Texas, College Station, Texas. Further reference to some of these papers is planned for a forthcoming issue.

Dominion Steel Aided by British and German Trade

DOMINION STEEL & COAL CORP., Sydney, N. S., had a net profit in 1938 of $1,239,170, compared with profit of $1,310,829 in 1937. Of the 1938 profits, it is likely that a goodly portion was contributed by the Wabana ore properties on shipments to Germany, amounting to about 700,000 tons. A contract for shipments of ore to Germany for 1939 calls for a total of 1,000,000 tons.

According to the Department of Natural Resources at St. John's, the Wabana ore properties are among the richest in the world. Reserves total almost 4,000,000,000 tons, with an average iron ore content of 52 per cent Fe. The mining area is practically all submarine and is reached by means of slopes from Bell Island, Conception Bay. The average annual production over the past 10 years has been 600,000 tons.

The Dosco company, as well as other Canadian companies, has benefited considerably by Britain's armament drive, and this situation is judged as being likely to hold for some time to come. The British are now taking up full contract shipments and in fact are drawing to some extent upon accumulations not taken in 1938.

British contracts with Dosco call for 100,000 to 115,000 tons annually, which is one-third of the company's present finishing capacity. Contracts with Britain are believed to run through 1940, and cover 75,000 to 80,000 tons of steel billets and 30,000 to 35,000 tons of wire rods, nails and bars, etc., yearly.

Dosco's operating structure was considerably enhanced by the purchase of the United States Steel Corp.'s Canadian plant for $3,000,000 recently. A program of rehabilitation and modernization is under way, and will involve the building of two additional open hearths and an expenditure of $1,750,000. The company will produce tin plate for Canada, most of which now comes from England.

T. C. I. Installs Blooming Mill at Fairfield

BIRMINGHAM—Machinery for a second blooming mill at the Fairfield tin plate plant of the Tennessee Coal, Iron & Railroad Co. is now being installed. Operations are expected to start in about a month. This mill was provided for in original plans but installation was delayed until needed.

Federal Trade Commission Declares For Absolute Mill Basing

ANALYSIS of the complete text of the Federal Trade Commission's report on "Monopoly and Competition in Steel" which was read to the Temporary National Economic Committee in Washington on March 7 (referred to briefly in THE IRON AGE of March 9, page 103) reveals little that the commission has not previously contended in its long warfare against the basing point system in the selling of steel. Much of the report is mere repetition of arguments that have previously been made.

It is obvious from the commission's arguments that it does not believe that last year's drastic changes in the basing point system and the elimination of nearly all of the price differentials as between important producing districts is the final answer to its persistent contention for an absolute f. o. b. mill basing, which, in the opinion of the steel industry, would mean the abolition of all freight equalization, thereby dividing the country up into steel marketing zones, in which frequently one or two mills would dominate the territory to the exclusion of all competition from other areas.

"The open f. o. b. mill price system is essential, in the commission's opinion," it is stated, "for the maintenance of fair competition in steel. To fulfill this purpose, however, there must be no obligation to maintain any announced price for any time whatsoever."

The Commission's Statement

THE following outline describes the price relationships which the commission has reason to believe exist in the steel industry. The statements are based on investigations of the industry made by the commission at various times. They are presented for the preliminary consideration of the Temporary National Economic Committee, and will be further developed as the committee's investigation proceeds. Although some changes in method were introduced in June, 1938, the fundamentals of the steel pricing system were not affected.

Briefly, the basing point system in steel operates as follows: For each particular steel product, a number of points have been selected at which "base prices" are quoted. The delivered price at any other point is computed by adding to the base price at each basing point the railway freight charge from that point to point of delivery and adopting the smallest of these totals. The steel may actually be shipped from a great distance or from next door to the customer's plant, but the delivered price is the same in all cases, that is, the customer pays as if the steel were always shipped from the "governing" basing point, i.e., that giving the lowest delivered cost according to the formula.

This is the skeleton outline of the system. In practice it is complicated by the existence of different basing points, for different steel products, and by a system of "extras," identical for all companies, representing special quality, size, shape, or quantity. In effect, however, the formula enables all steel producers, without the necessity of special consultation, to arrive at an identical delivered price for any order of steel delivered at any point in the United States. With occasional lapses, the system works, and the buyer normally receives identical quotations from all bidders.

The original basing point system in the industry was the so-called Pittsburgh Plus, under which steel was sold at a delivered price equal to the Pittsburgh price plus freight from Pittsburgh. Other basing points have since been established, and the present is a multiple system.

This report deals with the basing point system as the method for establishing the identical delivered prices found in the steel industry. It should be made clear that the objective of this examination is not to find some other mechanism for producing the same effect, but to consider the effects of identical delivered prices, whether derived from the use of a basing point formula, or by any other method.

Visible Effects of Identical Delivered Prices

When the basing point system is operating smoothly, it appears that quotations on steel of a given quality and quantity are identical at any given point of delivery. The formula, covering base price and rail freight from the governing basing point, is known to all members of the industry. Mills located at points other than the basing point use the standard formula as if they were located there.

To the customer, at his location, there is no difference between the quality and delivered price offered by all the bidders. Occasional variations from this perfect identity are observed, but only during short periods when there was a temporary flurry of price cutting. Such flurries have been an incident of practically all price-fixing systems. They occurred even in the days of signed price agreements in the steel industry.

On the surface, the producers approach the consumer with a united front. Competition in such crude matters as price and quality has been put aside, and all that seems to remain is a gentlemanly emulation in the art of making friends and influencing people.

Secret discounts or concessions in quantity or quality may continue to exercise an influence of a more material character in the case of strong and influential private purchasers. Small and medium-sized private buyers pay the formula price. Public bodies, not being permitted to accept secret favors, have no legal reason for choice, there being no lowest bidder, and are reduced to making awards by lot.

The available evidence indicates that secret violation of the identical delivered price system is seldom of such importance as to prevent the general economic effects of controlled prices.

Since the delivered price quoted is the same among bidders with many different freight costs, the net amount received or mill realization varies among the bidders, depending on their distance from the point of delivery.

A plant not located at a basing point will charge even to customers located at its own door the base price plus freight from the governing basing point. But in selling to a customer located at the basing point it will quote only the base price, and will deduct the actual freight from its plant to the customer at that basing point, leaving as a net return the base price minus freight.

A plant located at a basing point will sell its product at all points within the area where the delivered price is governed by that basing point, at the same base price, plus the actual rail freight to point of delivery. When bidding outside this area, however, it must "absorb" a part of the freight, which means accepting a lower net price in order to match the delivered price which is computed by the standard formula from some other basing point. That is, outside the area governed by its own

basing point, the basing point mill will acept varying net prices in the same way as a mill not located at a basing point.

Thus the immediate effect of this artificial price system is to distort the area of distribution of each mill, in such a way that its net return per ton of steel from different customers is generally different.

The customer who is nearest the place of production does not necessarily receive the lowest delivered price for steel.

If the nearby place of production is not a basing point, the customer located there must nevertheless pay the equivalent of rail freight from the governing basing point.

Attack Made on Cross-Hauling

Studies of actual sales of steel show that mills deliver steel in the neighborhood of other mills that are producing steel of the same kind, and these in turn ship their product to the neighborhood of their rivals, or even beyond. Physically this cross-hauling is a pure waste; it could be justified only if some other form of economy were to be obtained by means of an interchange of identical products.

Between two interconnected power systems, for example, power may flow in one direction at one time and back again at another, because of differences in the timing of peak loads. But no such excuse can be found for cross-hauling in steel. Occasionally an abnormal demand for steel may appear first in one place and then in another, so as to overload the nearest producing plants and require importation from others. The constant cross-hauling of steel, however, is a different matter. It is a continual and simultaneous process. It unquestionably shows that mills do not ordinarily supply the nearest customers before looking to more distant ones. The cost of the wasted freight must be borne in the first instance by the injured communities and in the last analysis by the general public in one form or another. The cost is actually covered by maintaining base prices so high that a producer can ship steel for long distances past another producing mill and still find the business worth taking.

Finally, the evidence at hand shows what is inherent in the pricing plan, that a customer not located at a basing point but located near a steel mill is deprived of the benefit of the low haulage cost from the nearest mill to his door. The neighboring mill will, to be sure, offer him a bid, but no better than he can get from mills farther away. Under this pricing system he would be as cheaply supplied if the nearby mill did not exist.

To call the relation of a mill to its nearest customers a "local monopoly" is to confuse the issue. The correct term is "advantage of location"; it represents a natural physical fact: low cost of transportation. This is no more properly called monopoly than would be the possession of a low-cost plant or an unusually efficient personnel. Since the avowed purpose of competition is to allow the consumer the use of the lowest-cost methods, any economy in the physical factors of production, including economy of transportation, is a legitimate competitive factor.

Moreover, a customer so located that steel can be shipped to him by barge or by truck, at less than railway freight costs, is not usually allowed the benefit of this advantage. The mill may ship by water or by truck, but with relatively few exceptions the quoted price is based on rail freight. It would seem that the reason for using rail freights in all cases is that only by so doing can identical delivered quotations be conveniently assured.

The system appears to be designed not as a means of computing actual delivered costs, but of assuring the absence of price competition at any point of delivery. This situation must involve a general and continuous waste, since it would obviously be more efficient if customers were able to buy at a lower cost from the nearest available source. It is a system that makes a profit for the producer by wasting the customer's money.

Identical Delivered Prices

It is reasonable to assume that the industry succeeds or expects to succeed in making the customer pay for the wastes of cross-hauling, and enough more to furnish a motive for the self-discipline involved in an identical delivered price system. The base prices established must be intended to produce a profit on the business as a whole, even though as an incident they may require a company to accept a comparatively low net return on some particular sale.

Experience indicates, in fact, that when the system temporarily breaks down, prices fall.

The pricing system in steel is often called an "umbrella," the implication being that it holds up a price level under which mills of all degrees of efficiency or obsolescence find shelter. There appears to be a tendency for obsolete mills to survive after new and more efficient plants have entered the field, resulting in excess capacity and a low average percentage of operation. As will be noted later, the value of an old plant would be more easily defended if it actually served a neighboring market at a net saving to the customers.

Overequipment in the industry, with failure to eliminate the least efficient plants, tends to discourage technological progress, but its chief effect appears to have been to accustom the industry to the idea of a low ratio of production to capacity. The industry has felt entitled to a price level that will allow it to make a profit when operating at less than 40 per cent of capacity, although this required percentage increased with the base price reductions of June, 1938.

But since the capital costs are a large factor in steel making, in effect the public is required to pay, on a given tonnage of steel, the capital charges on a larger plant investment than is needed to produce that tonnage. The price flurry of June, 1938, reduced base prices; the industry was forced to operate at better than 50 per cent of capacity to make a profit. This change was regarded by the industry as deplorable, though it led to large increases in production and consequently in employment. "The situation was competitive," Mr. Grace said, and he hoped that it had been cured.

If the concept of price adopted in Pittsburgh Plus case in 1924 is sound under the present law, the basing point practice may be regarded as one of systematic price discrimination designed to serve the interests of the sellers as a group, against the interests of such buyers as desire price competition, and of consumers in general. Such systematic discrimination should be distinguished from a different type—the sporadic, unorganized price discrimination found in an unprotected competitive market where unfair practices are permitted.

Discrimination in the absence of an identical delivered price system takes the sporadic form of charging profitable prices in nearby territory and accepting a lower net return on sales to customers who are in a position to buy from a rival's territory. This may easily become price raiding, a use of financial power to overwhelm a financially weaker competitor. By raiding one small competitor after another, a powerful company can acquire numerous plants and destroy competition over a large area, becoming a monopoly of the old fashioned type in which control over prices is obtained by ownership of the bulk of the business. This undesirable situation can be expected to occur if competition without protection against price raiding should be reestablished in industries now under monopoly control.

The custom of charging an extra price for small quantities of steel over the price for large quantities requires the small buyer to pay more for his material, but is not necessarily discriminatory in the sense used in this discussion, since there may be a difference in cost for producing and handling small items. If, however, the difference charged is excessive, it becomes a form of discrimination.

The fact that discrimination in an unprotected market may lead to monopoly is the origin of the opinion, often sincerely held by business men, that any kind of competition must inevitably destroy itself, and that only by controlled prices can individual businesses be actually preserved. The commission regards this line of reasoning as fallacious and disastrous.

The truth should be recognized, that a free market must be protected to prevent price discrimination, or it is likely to permit the survival of the financially strongest rather than of the most efficient. But to sanction private price controls such as those in the steel industry as a protection against price raiding is to establish monopoly by agreement for the sake of avoiding monopoly by capture.

The identical delivered price system in steel preserves the shadow of competition by giving up the substance.

The courts have long since declared it unlawful for a great combination to cut prices in one territory in order to destroy a local competitor, meanwhile making up the deficiency by the profits of other sections. A similar principle should be applicable in a vertically integrated company.

The Federal Trade Commission found in the Pittsburgh Plus case that the American Bridge Co. could underbid its competitors because of being able to buy materials from fellow subsidiaries of the U. S. Steel Corp. at lower prices than other fabricators could obtain them. Since this finding was entered, several other large steel producers have acquired fabricating companies, and thus have opportunities for a similar advantage over independent fabricators.

If such camouflaged discrimination is to be prevented, it would be necessary to insist that separate accounts be kept for all parts of a vertically integrated company as if they were independent concerns, and that these accounts be subject to visitation by representatives of the Government.

"Indicators of Monopoly"

In a heavy staple industry, such as steel, there are certain indicators that may be taken as manifesting the existence or absence of monopoly.

If the demand for steel in a certain district is larger than the neighboring mills can supply, those mills should be running at capacity, unless their costs are higher than the cost of outside mills by more than the freight. If mills are running part time, while steel is being shipped in, monopoly is indicated.

If the supply of steel in a district is larger than the local demand can absorb, there should be no steel coming in, but the local consumers should be fully supplied locally. If steel is being shipped in, and if the fact is not explainabe by cost differentials, monopoly is indicated.

Cross-hauling of identical products is a general symptom of failure of competition.

If identical or close bids on delivered steel are received from mills at different distances from the buyer, there is a presumption of monopoly, unless the facts can be explained by differences in cost of production. The only locations at which the receipt of closely similar bids, from diversely situated mills, can be disregarded as indicators are on the borderlines between producing areas.

Effects of Identical Delivered Prices

To summarize the effects which we have reason to believe follow from the system of identical delivered prices: the wastes of cross-hauling and of excess capacity and high capital overhead are saddled on the consumer as if they were legitimate costs. Under the guise of freight costs, buyers located at a distance from a basing point even though they purchase from a mill in their own city are charged what amounts to a penalty.

Thus the advantage or disadvantage of location for many buyers is an artificial one, which may be altered by arbitrary private decree through a change in the basing point. Price competition in the steel industry, during all periods when the system is working, is eliminated. High prices, not in conformity with the law of supply and demand, place unreasonable limitations on use of the material. The effect, when combined with that of similar artificial prices in many other lines of production, is a depressed condition which can be kept from utter collapse only by repeated doses of public subsidy.

Effects of Partial Competition

The fixed-price system in steel sometimes slips momentarily, as it did in June, 1938. When the momentary "competition" is cured and peace once more hovers over the industry, competitive practices still crawl here and there under the surface. But such vestigal remnants of competition are not enough to restore a healthy condition.

The industry is adjusted to a condition of monopoly. Its plants are located at points dictated by monopoly practices—many of them are relics of the Pittsburgh Plus, under which one principal basing point dominated the price structure.

A temporary restoration of competition is peculiarly painful to the industry because it cannot quickly adapt itself to an unprotected existence. Some of the independents, and some units of the larger companies, born and brought up under the "umbrella," fear to attempt a life of free competition. The desire to restore and maintain a monopolistic scale of prices is therefore a powerful influence in the industry. Moreover, such competition as does occur from time to time in the industry takes the form of sporadic discriminatory price cutting, in which the more powerful companies may use their power to discipline the weaker independents.

The commission agrees with the industry that unfair forms of competition should not be substituted in place of monopoly. The commission is opposed to both.

It is recognized that the industry will naturally fear the adjustments necessary for the establishment of healthy competition. The commission notes in the published hearings of the Subcommittee of the Senate Committee on the Judiciary on S. 10 and S. 3072, March 10, 1936, the following statement in a letter from the late Mr. John Treanor of the Riverside Cement Corp. to Mr. B. H. Rader of the Cement Institute. Although speaking of the cement industry, Mr. Treanor expresses a fear of competition that is common to other industries as well. He says:

"Do you think any of the arguments for the basing-point system which we have thus far advanced, will arouse anything but derision in and out of the Government?—They amount to this—that we price this way in order to discourage monopolistic practices and to preserve free competition, etc. This is sheer bunk and hypocrisy. The truth is, of course,—that ours is an industry above all others that cannot stand free competition and that must systematically restrain competition or be ruined. We sell in a buyers' market all the time."[1]

In steel, as the commission has observed, the normal and wholesome elimination of obsolete plants has not taken place. The industry has become addicted to monopoly as to a habit-forming drug. Its members fear nameless horrors if the drug should be withdrawn. Despite these fears, it remains true that a cure is necessary if the steel industry, together with American business in general, is to be restored to health.

"Monopoly Leads to Government Control"

To some extent the steel industry has eliminated obsolete plants, following the process of merger, the choice of plants to be closed being made arbitrarily by those in control of the merger. The commission calls attention to the fact that here, on a private scale, we see the substitution of arbitrary decision for the impersonal decisions of the free market in an important industry. But the philosophy of the competitive theory which underlies capitalism is that natural death in industry, under the forces of fair competition, is more merciful than death by fiat, and also more clearly in accord with the public interest. It is fair and reasonable that the best man should win, and that the loser should be obliged to hunt for some other source of income. But it is offensive to peace and good morals that a man should be driven out of business by financial power, whether his throat is cut in a sudden attack or whether he is captured first and killed later.

The experience of business in certain countries shows that if the natural elimination of the less efficient by competition is prevented, and elimination by private fiat is substituted, fiat will finally become the function of government. When the elimination of any members of an industry becomes the function of government, practices and injustices of an alarming kind have been observed.

The commission points out that the drift toward monopoly involves the disquieting prospect that decisions, once the product of an impersonal economic necessity, may become the function of private or public dictators under conditions that offer the victims no avenue of escape.

The ability to decide on a price and hold to it regardless of demand, which is the essence of monopoly, is a prime factor in establishing the vicious circle of high prices, restricted production, and reduced employment so widely condemned as "scarcity

[1] U. S. Senate Comm. on the Judiciary. Hearings of Subcommittee on S 10, S 3072, March 10, 1936, p. 537.

economics." Starting with a price level designed to protect obsolete and unnecessary plants, and therefore having long periods of part-time operation and high overhead, the steel industry has established a habit of low production and high cost that seems to justify high prices. The demand is thereby restricted, and the vicious circle is completed by the continuance of high costs based on restricted output.

Moreover, in a product like steel which serves as raw material for other products, and for the machines with which other products are made, any unnecessary cost will be multiplied from step to step throughout industry so far as the influence of steel extends. The consumer is burdened with monopoly costs of steel multiplied several fold.

Unless and until this vicious circle of scarcity and unemployment can be broken, it is clear that it will act to grip the business world in paralysis. The practices of the steel industry alone may not ruin the capitalist system, but if they are reinforced by monopolistic practices in other industries, the total effect may come to be a strangulation of the blood stream of trade. Monopoly, like counterfeiting, is a profitable business for the first comer, but is subject to diminishing returns when it is more widely practised.

There appears to be only one way in which the circle of high prices, low production and unemployment can be broken. That is through the restoration of price competition in accord with the ancient rule of capitalism, that at a low rate of production an industry ought to be losing money. The alternative is the abandonment of capitalism and experimentation with authoritarian controls.

Capitalist theory has always held that industry was expected to produce in the hope of profit, not that it was expected to stand idle at a profit. If the rewards of full-time industrial production are to be given equally for half-time work it is inevitable that labor and agriculture must also be supported on a half-time basis.

The commission is not impressed with the argument that, as steel output falls off and costs rise, it is necessary or desirable to maintain prices in an effort to break even. Such an argument violates the fundamental principles of capitalism. On the contrary, it is necessary and desirable to reduce prices in a falling market in an effort to increase tonnage and cut costs.

If free competition is not restored, the alternative will be public control of the details of business policy, including prices. wages, and production schedules. If private monopoly is permitted to spread through the greater part of the business system, public control appears to be unavoidable.

The commission calls attention to the sequence of events in countries where the cartel form of monopoly has been encouraged. Centralization of power is the forerunner of a state, in which business, both small and large, is entirely subject to the direction of the goverment.

To the commission the lesson seems clear that democratic liberty requires, as one of its foundation stones, the preservation and protection of a sufficient area of free capitalism to balance the necessary centralization of public utilities and other natural monopolies.

Freedom depends on preserving a wide field of opportunity for free initiative. Universal price controls constitute a repudiation of economic freedom and a demand for some form of authoritarian government.

A Discussion of Competition

It is suggested that the relationship of competition, discrimination, and monopoly requires more definite clarification and legal definition in the public interest. Business in this country has passed through two stages on the way to the establishment of law and order. The first, or pioneer, stage was one of unrestrained discriminatory competition, in which financial power and influence were often used as weapons to destroy competitors. By a natural process of evolution, business men in certain industries organized private agreements for preventing competition of a kind unprofitable to themselves.

These private organizations for bringing order into business have not eliminated discrimination but have organized it in their own interest. Organized price controls have turned out to be monopolistic and oppressive to the consumer, and a source of depression and paralysis to trade. It is necessary now to pass on into a stage of established law, in which the required protection against discrimination is given by law to competitors and consumers alike.

Without an effective guarantee of protection against unfair and discriminatory attack, business men can hardly be expected to relinquish voluntarily their efforts to maintain private monopolistic systems for mutual self-protection.

As a basis for a sound policy of fair competition as distinguished from monopoly, it is believed to be essential to recognize the fundamental objectives of the free market as applied to steel. The free market is expected to give to the consumer the benefit of the lowest cost of production, and to reward the producer who eliminates waste. The market is expected to reward not only efficient production within the plant, but also efficiency in choice of location which minimizes transportation costs.

It is recognized that a market, unless policed to prevent discriminatory prices and other unfair methods, may fail to distinguish between efficiency and the advantages of financial power, and may give the rewards to power rather than to efficiency, as illustrated by the effects of unfair competition. Free markets, therefore, must be policed to prevent interference by dominant force whether financial or physical.

The market, finally, is supposed to provide a competitive mechanism that will automatically eliminate obsolete capital, either by forcing obsolete steel companies out of business or by forcing them to scale down their liabilities. Definitions of economic terms must be drawn not from tradition, or from the "custom of the trade" as shaped by immediate private advantage, but from experience with the effects of such practices on the proper functioning of the market.

"Sound Competition" Defined

The commission believes that a condition of sound competition in the steel industry would be fair to the consumer, efficient as an item in national production, and as nearly as possible free of brutality or cutthroat activities.

Sound competition would be fair to the consumer because it would permit him to have any advantage of buying from the nearest mill at a minimum cost for freight. It would be fair because the prices he must pay would be under constant competitive pressure, since his local mill could not arbitrarily raise its price without giving up its borderline customers to a rival.

Sound competition would be fair to the consumer because it would reduce wasteful cross-hauling, the cost of which the nation must bear. It would promote decentralized location of mills, tending to favor the growth of numerous scattered mills close to customers, or in the shortest line between customer and raw material, an important item in terms of economic stability and of national defense.

Sound competition would be fair to the consumer because have tended to give competition a bad name and have unfortunately driven many business men to seek shelter in monopolistic agreements. While the effect of sound competition would be to give rewards to efficiency and proper location combined, it would act upon the less efficient rather by slow pressure than by sudden violence—impersonally rather than by the exercise of personal and arbitrary power.

It appears evident that a condition of sound competition would be favorable to the restoration of free initiative in the steel industry. Initiative may be considered as embodied in two forms, the establishment of new mills in favorable locations, and an active attempt of existing mills to get business by reducing costs to the consumer. Both forms are stifled in the steel industry by the basing point system.

The protection of obsolete plants under the umbrella, by retaining excess capacity in the industry, impairs the incentive to .build new and more efficient plants or to secure a better location.

Free initiative in the sense of trying to get business by offering advantages to the consumer is not only restricted under the basing point system, but it is regarded as an offense, subject to the danger of retaliation by the industry.

If a mill merely follows the price leaders in a generally observed price system, it has relaxed from competition, and is trusting to some more subtle influence to provide its share of the business. Initiative means leading the price in its own area, and leading it down to the level at which the area of the local mill is effectively protected by freight costs against the loss of its profitable business. Initiative in the form of local self-determination is seldom, if ever, found today in the steel industry.

Local initiative is frowned upon by the leaders of the industry. In 1930, a steel industry leader deplored that "several months ago price instability was permitted to come into our commercial relations." Another high steel executive, saying that price cutting kills business, added: "We have got to be honest." The potential punishment for any serious attempt to violate the basing point price system is price raiding, that soon brings the rebels to terms. It is vital to an understanding of this situation to make clear the ethics on which it is based.

The "Chiseler" is Defended

Unethical conduct in selling steel includes those underhand devices by which a company offers material inducements to the buyer while pretending to stick to the concerted formula under which no bid at any given point of delivery will be better than any other bid at the same point. Such methods are abhorred by each member of the industry when used by others to his disadvantage. They violate the so-called "ethics" by which all the brotherhood is bound together against the consumer.

A chiseler is an unreconstructed capitalist who fails to obey the rules of the monopoly. He may also be dishonest in his methods, but chiseling and dishonesty are not identical, and the distinction is vital. To accuse a person of dishonesty may be necessary and in the public interest. To use the word chiseler, however, as meaning merely one who competes by reducing prices without discrimination, is to attack the foundation of free initiative, and to invite autocracy.

The commission holds no brief for deception, but is convinced that the so-called ethical principle which opposes price competition, forcing it into the form of underhand dealings, is itself contrary to the public interest. We believe that competition in steel should be brought into the open and protected against reprisals that threaten to drive it back into the dark. Suppression of competition breeds deception; the cure is not punishment but freedom and protection of individual rights.

Unfair competition, in addition to various forms of fraud and misrepresentation, includes specifically the use of discrimination for the purpose of price raiding. The Commission believes, as does a large share of the business world, that price raiding is a form of industrial violence; sound competition cannot be preserved unless price raiding is effectively prevented.

Approach to the Problem

The commission considers it to be essential to distinguish between protection of the markets and government control over business.

Protection works from the outside; its examination of business practices is only for the purpose of enforcing the rules of conduct as required for the protection of freedom. Control penetrates the interior of business, impairing or destroying the exercise of legitimate private initiative.

It is recognized that certain public utilities, including transportation, communication, and domestic power distribution, are in some measure required by technical necessity to operate as monopolies. As monopolies these industries have long been subject to a large measure of public control of their prices, wages, and production schedules; in some cases they have been taken into public ownership. The classification of industries as necessary monopolies should be, in the commission's opinion, kept to as narrow limits as technical considerations permit.

It is suggested that in order to protect competitive business, monopolies must be held to exist only by sufferance in the capitalist system, and to be properly subject to public control in all details affecting the public interest.

Public control over monopolies is to be clearly distinguished from regulation of competitive practices, established to give protection to free competition in industry. The latter does not attempt to fix reasonable prices or to interfere with the countless details within each individual private enterprise.

Possibility of Government Control

There is reason to believe that most industrial operations are capable of attaining the highest degree of technical efficiency with plants of moderate size. Even though a modern steel plant may be physically large, it is relatively small in comparison with the total steel business of the United States. If monopoly is to be permitted in such industries, the commission can see no escape from the necessity of removing them from the privileges of free capitalist management and placing them under Government control.

The commission denies the necessity for such an outcome in the case of steel. We believe that to socialize the iron and steel industry, probably the leader of American business, would be a dangerous precedent. Such an example might easily spread far through the business world, tending to the breakdown of private enterprise and the rise of au authoritarian state.

The commission therefore suggests that the steel industry, which it believes to be capable of reasonably efficient operation without monopoly, should be definitely separated in public policy from the "natural" monopolies, and treated as a free enterprise. As a free enterprise, it should be given an effective protection that will positively assure it of continuous, sound, and wholesome competition. The larger the area of business in which fair competition can be assured, the wider the margin of safety against the loss of both economic and political freedom.

The prevention of identical delivered prices for steel is, in the commission's opinion, necessary for the restoration of competitive conditions. This involves the necessity for the elimination of the basing point system, since the purpose and effect of that system is to prevent price competition. It will also be necessary to prohibit any variation or substitute for the basing point system, the effect of which is to establish identical delivered prices.

It is submitted that the principles to be applied to the steel industry should be those laid down in the Pittsburgh Plus case when the respondents were ordered to cease and desist:

"From quoting for sale or selling in the course of interstate commerce their said rolled steel products upon any other basing point than that where the products are manufactured or from which they are shipped.

"From selling or contracting for the sale of or invoicing such steel products in the course of interstate commerce without clearly and distinctly indicating in such sales, or upon such contracts or invoices, how much is charged for such steel products f.o.b. the producing or shipping point, and how much is charged for the actual transportation of such products, if any, from such producing or shipping point to destination."

Declares for Open F.O.B. Prices

The open f.o.b. mill price system is essential, in the commission's opinion, for the maintenance of fair competition in steel. To fulfill this purpose, however, there must be no obligation to maintain any announced price for any time whatsoever. Further detailed regulations required for the protection of any open market, need not be listed at length in this preliminary discussion.

The fact that sound conditions can be restored only with considerable trouble and expense is not a sufficient reason for doing nothing, nor for adopting irritating but ineffective half measures. The capitalist system of free initiative is not immortal, but is capable of dying and of dragging down with it the system of democratic government. Monopoly constitutes the death of capitalism and the genesis of authoritarian government.

The steel industry is a focal center of a monopolistic infection which, if not eradicated, may well cause the death of free capitalistic industry in the United States. This commission is invested by law with the duty of assisting in the protection of competitive capitalism and its restoration to health. Whatever such protection may cost, we believe it will be less costly to capitalism and to freedom than any alternative.

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

o o o

. . . Auto production continues gains, reaching 84,095 units . . . February reports indicate much hand-to-mouth buying . . . Chevrolet Buffalo branch expansion planned.

DETROIT — Indications offered by increasing automobile production, particularly in independent plants, lend support to the belief that hand-to-mouth buying will become less pronounced during the current month. Records for February have indicated that the short-range outlook in purchasing departments prevailed, in part, because car production was being geared so closely to sales.

Now, with automobile sales running sharply above a year ago, manufacturers have boosted production for the second successive week. Except for greater output at Ford Motor Co., the increases were noted mostly in the smaller plants.

According to Ward's Automotive Reports, production in the last week totaled 84,095 passenger cars and trucks in the United States and Canada, which compared with 78,705 the previous week and 57,438 a year ago. Chevrolet maintained its rate of 21,000 which has prevailed for weeks. Plymouth moved upward only slightly from 9700 to 9880, while Ford reached 15,600 from the previous week's 14,000. Lincoln-Zephyr output remained at the 600 level. Studebaker, getting into volume operations on its new model, the Champion, accounted for part of the gain; Nash showed an important increase; Willys and Hupp returned to production, and Hudson increased operations to four and one-half days and several hundred employees were recalled to work.

William R. Tracy, vice-president in charge of Hudson sales, said: "Because of the upturn in retail sales production has been increased 40 per cent during the last two weeks."

There seems to be general agreement that no sensational increases in production will be recorded during March. The gains already made will be held or increased slightly, while dealers outlets are primed for spring business. A return to five-day production in some of the large plants now operating only four days a week is expected by the end of the month.

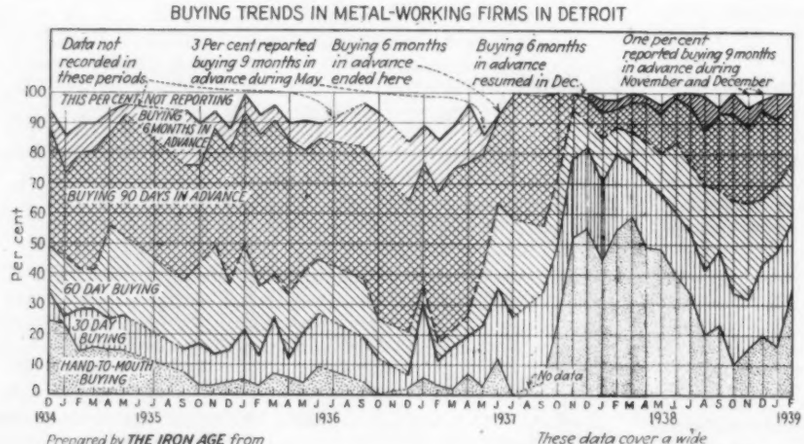
One of the most outstanding sales gains recorded by any of the plants is the statement of Willys-Overland that factory sales in February were 99.79 per cent greater than in February, 1938.

For most companies, the last 10-day period in February showed an increase of approximately 40 to 50 per cent in retail sales, compared with the preceding 10 days. For instance, total Buick retail deliveries amounted to 12,687, but the last 10 days accounted for 5144. Many sales organizations in the industry report similarly that most of the month's sales were concentrated in the last 10 days. Yet the month's total registrations will be only about 6.9 per cent below January, it is predicted by R. L. Polk & Co., on the basis of new passenger car registration reports covering only the first 22 days of February, leaving a few of the best selling days of the month unaccounted for as yet. The figures are encouraging in view of the natural January-to-February registration decline. Earlier returns indicated much lighter registrations.

Buyers' Sentiment Changing

In the light of these later developments, there has been a change in buyers' sentiment in recent weeks. However, the survey of the Purchasing Agents Association of Detroit shows without a doubt that February was marked by the adoption of conservative, hand-to-mouth buying policy on the part of nearly three-fifths of the Detroit purchasing agents; 36 per cent of the buyers reported that they

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
One per cent reported buying 9 months in advance during November and December
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
70
60
50
40
30
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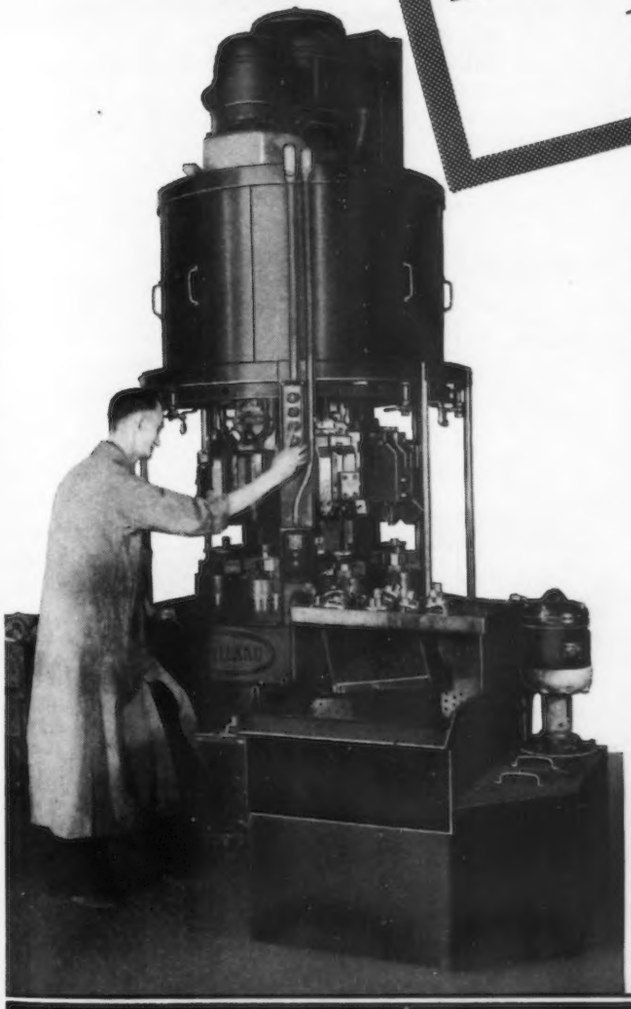
0
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F
1934
1935
1936
1937
1938
1939

Prepared by ***THE IRON AGE*** *from data supplied by* ***PURCHASING AGENTS ASSOCIATION OF DETROIT***

These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory and auto plants

SATISFIED USERS *tell the story*



J-7 MULT-AU-MATIC

Here's a case where the Type "J-7" Mult-Au-Matic was tooled for several comparatively short run jobs. It proved so Profitable on the original set-up that it was considered unprofitable not to find other jobs to be done the Mult-Au-Matic way. Today there are eleven different jobs being done on this machine and more to come.

Said one man: "If we can make money this way, I can't see why others don't jump at the chance, too."

We'll help. Send in your Problem jobs, because as a rule Problem jobs are no Problem at all when set-up on the Mult-Au-Matic.

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

were following a strict program that held their purchases generally within a 10-day range. Immediately outside this concentrated group, but close to it, 22 per cent of the buyers declared that all their buying was within a 30-day range. Combined, these groups accounted for 58 per cent. A further 20 per cent was keeping within the 60-day range; 19 per cent within 90-day range and only 3 per cent looked six months ahead with any degree of certainty.

The unusual shift in sentiment, compared with January, attracted considerable attention and called for explanation. Among the factors which received blame by the buyers themselves were uncertainty of sales prospects and in commodity prices. Buyers concede that these two factors, coupled with the known ability of suppliers to deliver on short notice have had an important influence on buying and resulted in much of the short range buying.

Chevrolet Addition Scheduled

Not yet officially authorized, but quite definitely on the schedule, is a 100,000 sq. ft. addition to Chevrolet's Buffalo assembly plant. It is understood that the additional building will be used mostly for Fisher Body work. Total cost is expected to be in the neighborhood of $2,000,000 for plant and equipment. This year will see very little automobile plant expansion, since the industry has already taken care of most of its prospective needs. However, the new construction will come right on the heels of the current work at Grand Rapids, where the Fisher stamping plant is being approximately doubled in floor space.

The expansion will offer Chevrolet more complete Eastern facilities. In the immediate neighborhood is the Tonawanda plant, which manufactures engines and rear axle assemblies. This division, incidentally, is tooled up only to about two-thirds of its potential capacity.

Work Stopped on Light Packard

A short time ago work on the Packard light six, which has been promised for release some time this year, was unexpectedly called to a halt. No explanation has been forthcoming from Packard, and it has been impossible to learn authoritatively whether the program has been definitely called to an end, or merely delayed. However, the program had advanced to the stage where most of the die work on it had been released and was in progress.

A study of the position of automotive parts makers indicates that, with March releases on the increase, earnings for the first three months of 1939 will be at a considerably higher level than they were a year ago. Substantial losses were recorded for most companies in the first quarter of 1938, but the final quarter set most of these firms back on a firm basis.

Sedan Type Predominates

Public preferences for automobile body types and color are continually undergoing study so manufacturers can keep pace with the changing likes of their customers. Despite the many new body types that have been introduced, however, the general public still votes overwhelmingly for the standard four-door five-passenger sedan. According to Buick, 82 per cent of 1939 models sold up to Feb. 20 were sedan types. The four-door sedan was listed on 68.2 per cent of the orders, while second place went to the two-door sedan which was specified by 13.8 per cent of the customers. Next in order were the standard business coupe, the opera coupe, convertible coupe and phaetons and finally, limousines. These types combined to account for 18 per cent of the volume.

The Buick study also revealed that the family car is black, or a dark shade of gray, blue or green. While black predominates in the Buick sales, accounting for about 40 per cent, sales of 1939 Chrysler Royal models show that the percentage of black cars sold is the smallest in years, amounting to only 25.8 per cent against 74 for colors other than black, which remains the largest single choice, of course.

If there is anything in the theory expounded by W. A. Lindberg, Chrysler Corp. color engineer, business would seem to be due for an upturn. His explanation is that the public buys a larger percentage of bright colored cars in good times than in bad.

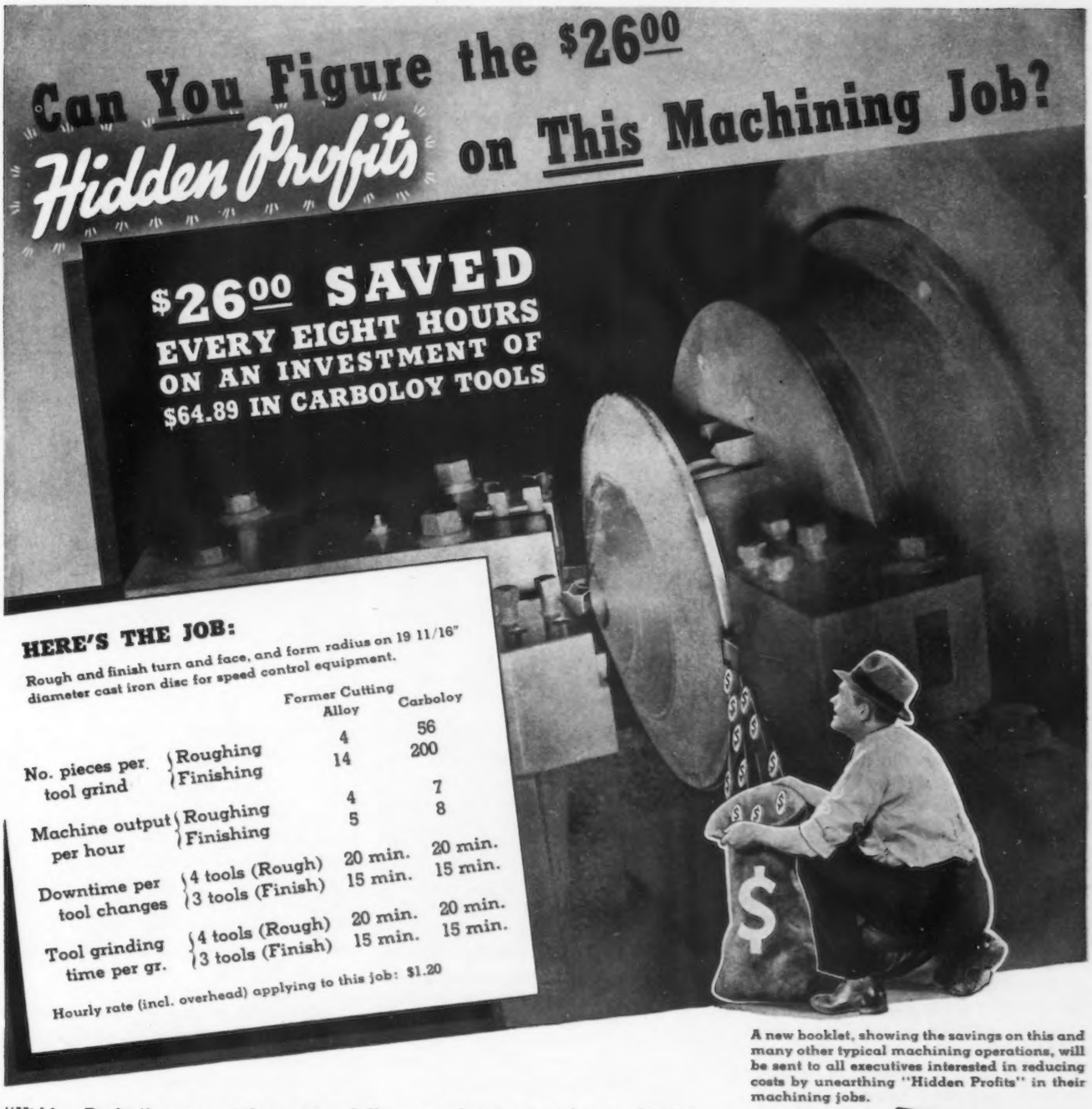
THE BULL OF THE WOODS — BY J. R. WILLIAMS

LISTEN, KID, YOU GIT BACK INTO THE SHOP AN' GIT TO WORK! YOU'RE GOIN' OUT BEHIND THE ENGINE ROOM TO SNEAK A SMOKE -- YOU'LL BE GITTIN' CANNED
OH, YOU GOT HIM, ED - I SEEN HIM TOO -- GIVE HIM A TALKIN' TO!
DEES KEED, HEES GAT DE FOUR BRUDDERS IN DE SHOP -- HEES GAT WOT YOU CALLINK DE DOG'S LIFE
YES, IT'S WORSE THAN HAVIN' THAT MANY FOREMEN AFTER YOU..... BUT I GUESS THEY'RE JUST LISIN' HIM TO MAKE UP TO TH' COMPANY FER ALL TH' LOAFIN' THEY DID
J.R.WILLIAMS
HEROES ARE MADE-NOT BORN
T. M. REG. U. S. PAT. OFF. COPR. 1939 BY NEA SERVICE, INC.
3-10

Gray Iron Founders Annual Meeting May 15

THE Annual Meeting of the Gray Iron Founders' Society, Inc., will take place at the Netherland-Plaza Hotel, Cincinnati, Ohio, on Monday, May 15, at 10:00 a.m. All executive officials of Gray Iron Foundries are invited to attend this meeting.

Can You Figure the $26.00 *Hidden Profits* on This Machining Job?



HERE'S THE JOB:

Rough and finish turn and face, and form radius on 19 11/16" diameter cast iron disc for speed control equipment.

		Former Cutting Alloy	Carboloy
No. pieces per tool grind	Roughing	4	56
	Finishing	14	200
Machine output per hour	Roughing	4	7
	Finishing	5	8
Downtime per tool changes	4 tools (Rough)	20 min.	20 min.
	3 tools (Finish)	15 min.	15 min.
Tool grinding time per gr.	4 tools (Rough)	20 min.	20 min.
	3 tools (Finish)	15 min.	15 min.

Hourly rate (incl. overhead) applying to this job: $1.20

A new booklet, showing the savings on this and many other typical machining operations, will be sent to all executives interested in reducing costs by unearthing "Hidden Profits" in their machining jobs.

"Hidden Profits" represent those extra dollars now being spent for machining expense that could be saved towards profit.

In the above case, these savings, in terms of reduced machining time, less downtime for tool changes, and less tool grinding time, amounted to $26.00 in the first 8 hours of operation, or 40% of the actual cost of the Carboloy tools!

Just how those savings are figured, and the types of jobs on which you can make savings, is the interesting story told in a new booklet just off the press. Copy sent upon request.

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Street_____

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☐ Check here if you wish us to include method of figuring the saving on the job illustrated.

THIS WEEK IN WASHINGTON

. . . New Deal goes to businessmen "bearing gifts" . . . Steel Industry may get chance to answer FTC's monopoly claims . . . Bills pending in Congress would ease loans for small companies . . . Steel wage fight going to U. S. Appeals Court.

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By L. W. MOFFETT
Washington Editor, The Iron Age

o o o

WASHINGTON — The first round in the so-called investigation of the steel industry by the Temporary National Economic Committee started and ended in an impenetrable fog of mixed abstruse economic theories.

Having been a Federal Trade Commission show it was to be expected that the industry would be bitterly mauled. But the FTC's violent blast of socialism that the "steel monopoly" threatened the capitalistic system was distinctly accepted by the TNEC only with the understanding that the committee took no responsibility for the views expressed. Whatever the TNEC may finally do, either in approving or rejecting the FTC position in whole or in part, Senator O'Mahoney, Democrat of Wyoming, chairman of the committee, announced that the FTC statement had been accepted "merely as a statement of the Federal Trade Commission's opinion and not to be regarded in any sense as expressing the views of the committee as a whole."

Industry to Get Hearing

The committee, Senator O'Mahoney said, would not be content to base any final judgment on the statements of Government bureaus alone but proposed to give industry opportunity to present any statement it may wish to make.

The FTC statement was noted chiefly for the unusual vigor, its inflammatory character and extent of its attack on the steel industry. Read to the committee by Eugene W. Burr, the commission's "steel expert," the statement, otherwise simply repeated, in a more or less comprehensive form, the economic philosophy the FTC always has expressed with respect to the basing point system, and in effect declared that unless that system in industry was abandoned in favor of an f.o.b. system, Government control is inescapable.

Wiffwaff and Ugwug

Unquestionably the FTC attitude is discounted by at least some, if not all, members of the TNEC, precisely as it is not shared by other Government bodies, which, though not friendly to the steel industry, do reject the FTC contention that there is no competition in the industry. The economists themselves, judging from their conflicting, not to say confusing, theories, are wide apart with respect to what should be done to regulate "big business." Some who easily assume that this or that industry is monopolistic—though confessing the vagueness of the term —see good in "monopolies" and would grade and apply various controls to them. Such, in effect, was the proposal of Jerome Frank of the Securities and Exchange Commission who coined and contributed to the economic melange that surrounded the FTC steel hearing the mystifying terms wiffwaff," "agway" and "ugwug." Mr. Frank conceived of these alphabetical novelties, remindful of a baby's prattle, as a system of graded regulation of "socially desirable" monopolies, the "wiffwaff" to apply to "agway" in "ugwug." Addressing Dr. Frank A. Fetter, former Princeton University professor and FTC witness against the steel industry, the SEC Commissioner said he coined the words because old ones had become bound up in prejudices and emotional connotations, and were in need of clarification. He referred particularly to such terms as competition, monopoly, Government policing and Government regulation.

Frank Questions Fetter

Dr. Fetter had expanded with his accustomed academic assurance on the desirability of competition in the steel industry, and strongly urged abolition of the basing point system as a means of compelling decentralization of the industry into small units. Mr. Frank, while denying he was criticizing the FTC, did question some of its premises with respect to absence of competition in the steel industry.

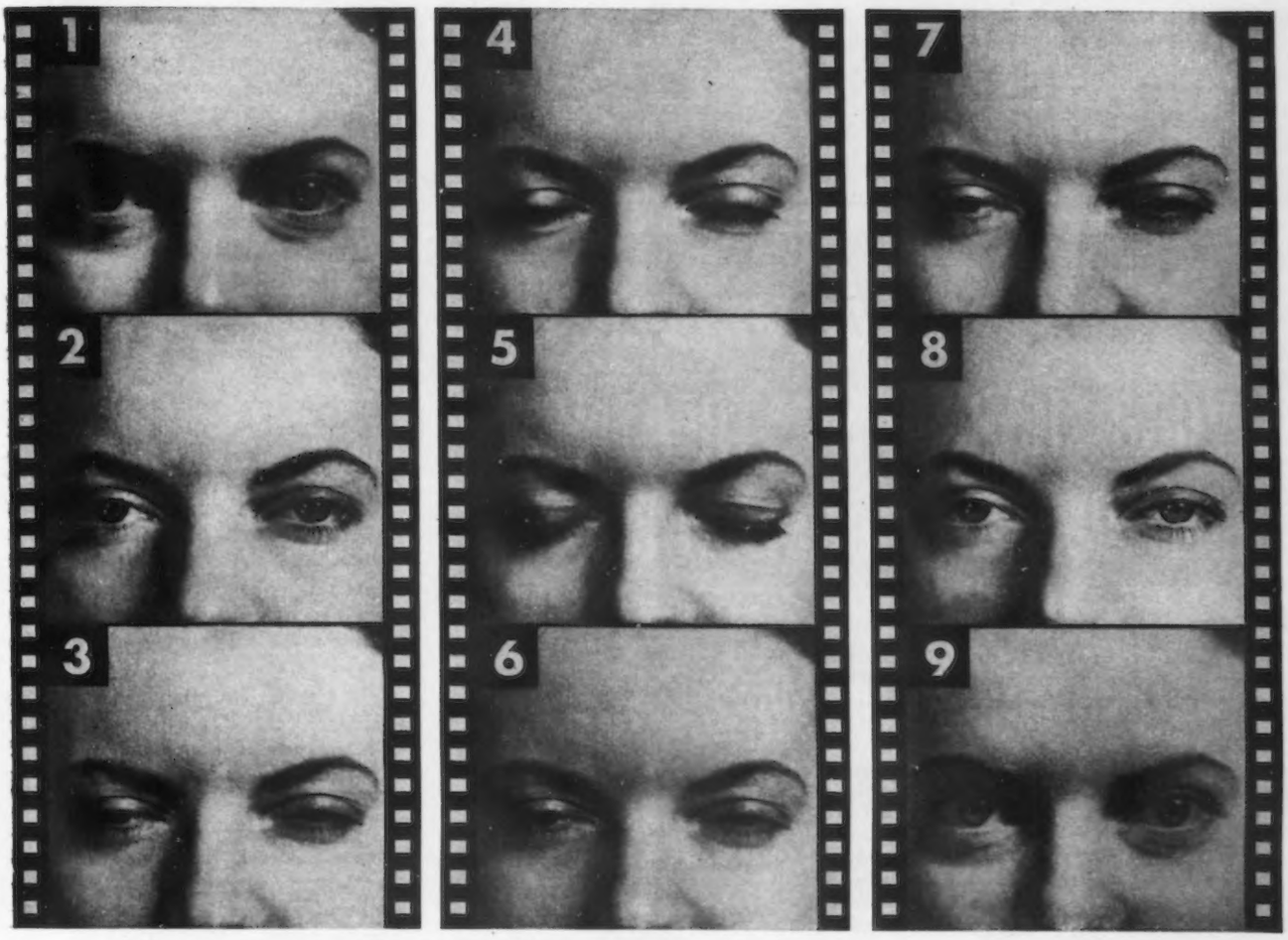
"Much has been made in the discussions here of the social waste and economic losses to the community resulting from monopoly," said Mr. Frank, addressing Dr. Fetter. "I would like to explore with you the question whether competition does not also at times lead to a great economic and social waste."

Dr. Fetter, who was asked to make a dogmatic answer, if possible, replied that competition certainly does lead to less waste than does monopoly. Dr. Fetter had criticized the basing point system as causing great waste by reason of cross hauling.

Mr. Frank urged, however, that it is necessary to base conclusions on facts and not generalizations if problems are to be met intelligently. He inquired, "If we find monopolistic conditions, whether rather than seeking

THEY STARED AT A BLINKING GIRL

and found a new key to human comfort



These nine photos, taken with a super-speed camera, show progressive stages in the course of one blink.

OF all the strange tests and experiments carried on at the General Electric Lighting Research Laboratory at Nela Park, Cleveland, few have turned out to be of greater importance to industrial plants than the "Blink Test."

The test consists merely of recording the number of times a person blinks under various kinds of light. But it shows that nearly all of the hidden discomforts caused by poor seeing conditions are revealed by the "rate of blink!"

Thanks to lighting research of this type, the kind and amounts of light needed for performing various industrial processes efficiently and with a minimum of eyestrain, can easily be determined. With a G-E Light Meter, you and your shop foreman and plant superintendents can measure the light accurately.

Important to the success of any relighting program is the use of good lamp bulbs. Thrifty industrial purchasers buy G-E MAZDA lamps because these lamps *stay brighter longer* . . . provide more light at no additional cost for current. Use the new, brighter 1939 G-E MAZDA lamps in your plant.

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A G-E Light Meter measures light as simply as a thermometer measures temperature. You can tell whether the various departments in your plant are getting enough light for safe seeing. Costs $11.50.

GENERAL ELECTRIC
MAZDA LAMPS

to eliminate, we shouldn't try to make the monopoly or monopolistic condition more socially useful, and whether our economy would not be bettered by doing that than by seeking in some means to procure a restoration of what we call competition." He suggested that "far more can be done by intelligent cooperation between Government, the components of the industry, the suppliers of the materials, the purchasers of the materials, labor and the consumer, than we have anywhere as yet canvassed."

After a squabble in the committee with conflicting views aired over the question of enforcement of the anti-trust laws or industry-by-industry approach for Government-business cooperation, Mr. Frank made it clear he did not wholly repudiate everything done by NRA but insisted it had reduced production and increased prices. He declared he wanted to see a reversed economic trend—increased production, reduced prices and increased employment. To this end, he proposed the possibility of a super code under Government control to bring about what he called hard bargaining between selling and purchasing industries. As an example, he said automobile manufacturers under this plan could walk in before the steel people and say, "We want lower prices for steel." Mr. Frank's conception of planned production was based on the contention that technological progress had eliminated competition in some industries, and that "if we are going to get competition we must use new devices."

No NRA Post Mortem

Leon Henderson, Executive Secretary of TNEC, took exception to the declaration by Willis J. Ballinger, economic adviser to the FTC, that NRA had totally betrayed the public interest. Mr. Henderson formerly was head of the NRA Research and Planning Board and made a warm defense of some, but not all, of the efforts of NRA. Mr. Ballinger, modifying his earlier indictment of NRA, suggested that the TNEC might well study and take over some of the good things which the NRA developed.

At this point Senator King, Democrat of Utah, acidly interpolated that as far as he was concerned the NRA episode is ended.

"It is out of the window," the Senator declared. "I do not feel that it is the duty of this committee to hold a post mortem on either the virtues or evils of NRA."

Wendell Berge, Assistant to the Attorney General, asked Dr. Fetter if the latter thought vigorous enforcement of the anti-trust act would result in better control of business and whether or not it could be applied to steel.

Dr. Fetter said that far from believing that the anti-trust laws had been ineffective, he felt that the difficulty was that they had been inadequately enforced. He expressed the opinion that there is far more possible from enforcement, not so much with respect to the basing point system, as to mergers and combinations. He declared that a strong burden of proof should be placed on industry not only that it is not monopolistic but that it is in the public interest.

Mr. Berge cautioned against too general attack on problems on control and suggested that there should be an industry-by-industry approach. Dr. Fetter said he agreed with the necessity for caution but that there can be too great an assumption of differences of problems in industry.

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ment of Justice reported that a fair volume of replies has been received from small steel companies to the questionnaires jointly sent out with the FTC respecting distribution and prices of steel in February. Since it is more complicated for the larger companies to make the report answers from the latter have not as yet been received. It is possible that further hearings on undisclosed subjects will be held before replies from the questionnaires are analyzed.

Government Steel Orders For Week Ended March 4

WASHINGTON—Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended March 4, totaled $297,968.95. Details of the awards together with contracts covering related products follow:

Iron and Steel Products

Lansdowne Steel & Iron Co., Morton, Pa., steel forgings	$12,581.25
Tennessee Metal Culvert Co., Knoxville, Tenn., welded steel pipe	13,011.49
Tri-State Mine and Mill Supply Co., Cumberland, Md., cast iron pipe	15,176.88
Republic Steel Corp., Cleveland and Buffalo, rivet steel	10,695.63
Carnegie-Illinois Steel Corp., Pittsburgh, steel	36,637.10
Reeves Steel and Mfg. Co., Dover, Ohio, sheet steel	12,488.28
Sheet Metal Mfg., Div. of Reliance Steel Corp., Youngstown, Ohio, sheet steel	63,466.09
The Cleveland Range Co., Cleveland, Ohio, steam cookers	26,775.00
J. C. Pitman & Sons, Inc., Lynn, Mass., deep fat fryers	10,302.00
The G. S. Blodgett Co., Inc., Burlington, Vt., bake ovens	9,199.80
Edge Moor Iron Works, Inc., Edge Moor, Del., steam kettles	20,946.75
Bethlehem Steel Co., Bethlehem, Pa., steel sheet piling	37,768.68
Baldwin Southwark Corp., Eddystone, Pa., base ring weldments	16,200.00
Hammond Iron Works, Warren, Pa., tanks	12,720.00

Non-Ferrous Metals and Alloys

Pollak Mfg. Co., Arlington, N. J., cartridge and powder tanks	$384,781.43
Aluminum Cooking Utensil Co., New Kensington, Pa., aluminum kettles	13,987.82
International Minerals and Metals Corp., New York City, copper	69,378.00
Tuthill & Co., Inc., New York City, pig tin	80,640.00
Charles Mundt & Sons, Jersey City, N. J., nickel-copper sheets	11,454.80

Machinery

Morse Chain Co., Detroit, Mich., diesel engine parts	$47,743.23
Empire Equipment Co., Billings, Mont., tractor repairs	35,000.00
R. L. Harris, Inc., Knoxville, Tenn., tractors	18,280.26
Austin-Hastings Co., Inc., Cambridge, Mass., planer	15,816.00
Copeland Refrigeration Corp., Sidney, Ohio, elec. refrigerators	12,162.57
Franklin P. Miller & Son, Inc., East Orange, N. J., elec. ice cream freezers	9,180.00

Army and Navy Asks for Bids on Machine Tools

BOSTON — Army Department, Commanding officer, Springfield, Mass., has asked bids on the following equipment on dates mentioned:

Special machine, Pro. 286. March 13.

Milling machine, Pro. 309. March 30.

Two motor driven automatic milling machines, Pro. 306. March 13.

Automatic milling machine, Pro. 310. March 14.

Milling machine, Pro. 328. March 16.

Machinery and equipment, Pro. 319. March 16.

Milling machine, 1 15-in. double disk grinder, March 13.

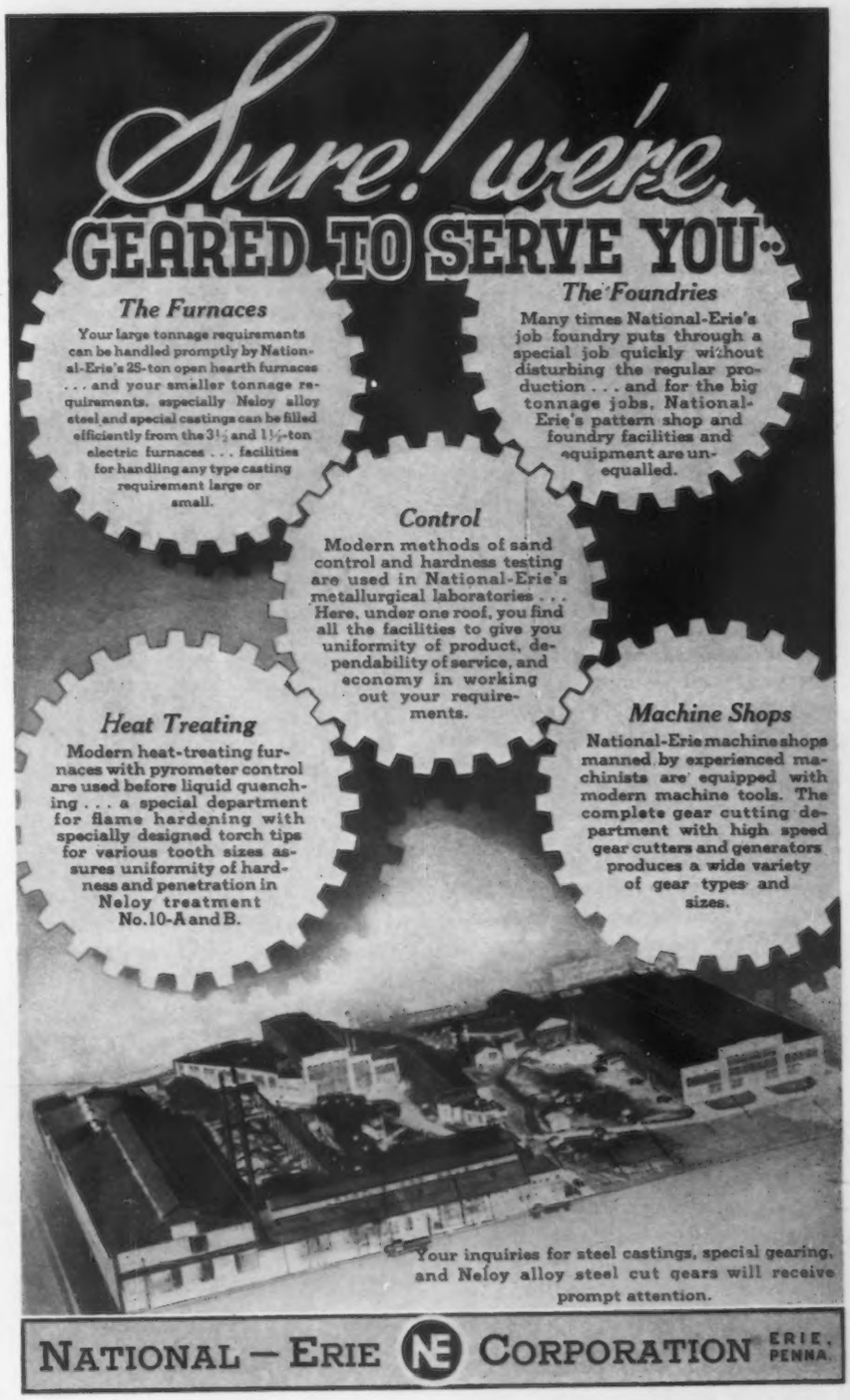
Grinder, 15-in. double disk grinder. March 13.

Milling machine, automatic. March 14.

Barrel, right-hand tumbling. March 13.

Navy Department, Boston. Bids close March 17.

Four motor driven turret lathes. One set of bar equipment and one set of chucking equipment.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Your large tonnage requirements can be handled promptly by National-Erie's 25-ton open hearth furnaces . . . and your smaller tonnage requirements, especially Neloy alloy steel and special castings can be filled efficiently from the 3½ and 1½-ton electric furnaces . . . facilities for handling any type casting requirement large or small.
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Modern methods of sand control and hardness testing are used in National-Erie's metallurgical laboratories . . . Here, under one roof, you find all the facilities to give you uniformity of product, dependability of service, and economy in working out your requirements.
Heat Treating
Modern heat-treating furnaces with pyrometer control are used before liquid quenching . . . a special department for flame hardening with specially designed torch tips for various tooth sizes assures uniformity of hardness and penetration in Neloy treatment No. 10-A and B.
Machine Shops
National-Erie machine shops manned by experienced machinists are equipped with modern machine tools. The complete gear cutting department with high speed gear cutters and generators produces a wide variety of gear types and sizes.
Your inquiries for steel castings, special gearing, and Neloy alloy steel cut gears will receive prompt attention.
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Bills Before Congress Would Aid Small Companies' Credit

WASHINGTON — Governmental assistance to improve the credit facilities for small enterprises, a subject which was the outstanding topic for discussion at the 1938 conference of small businessmen in Washington, is the objective of several bills pending in Congress, the latest of which is one sponsored by the American Federation of Little Business, one of the hundreds of organizations which took root from the 1938 meeting. The bills have been introduced by Senator Logan, Democrat of Kentucky, and Congressman Patman, Democrat of Texas and co-author of the Robinson-Patman anti-price discrimination law.

After receiving the assurance in Secretary of Commerce Hopkins' maiden speech in Des Moines that "one of my principal interests as Secretary of Commerce will be to see that the resources of the Government are particularly directed towards aiding these small enterprises," the bill was launched with the hope that Administration support, over and above that promised between the lines of Mr. Hopkins' speech, will be forthcoming.

12 Regional Credit Banks

Described as closely patterned along the lines of the existing Home Loan Bank-Federal Savings and Loan system, the measure provides for the creation of 12 regional intermediate credit banks in which private capital and private management would be combined with Government capital and Government regulation. Local investment associations would make loans up to $100,000 for business purposes, including character loans, when credit is not otherwise available through the usual local commercial banking channels.

Although other Congressional members express doubt that the Congress will go to the extent contemplated in the Logan-Patman bill in expanding credit facilities, they consider it likely that some steps may be taken to relax RFC facilities as was done last session, but only to a limited degree.

Other members, insisting that a genuine need exists for long-term loans and that Congress may approve such a measure, point out that Congress, in the period between 1920 and 1932 in an effort aimed at removing abuses, abolished the intermediate credit system existing in the so-called "bank affiliates," and no machinery remained to substitute the recognized service performed by the banking corporations.

New Dealers Go To U. S. Industry Bearing Gifts

WASHINGTON—The Administration was seen this week attempting to crowd into the next few months a maximum number of conciliatory gestures toward business in a last-stand effort to halt an adverse political tide which threatens to make the New Deal only a subject of historical interest after 1940. Indeed, Administration leaders are moving in so many directions in carrying out their latest business appeasement program, it is difficult to point to a single field to which the announced intentions do not extend—unless it be in the field of Government spending.

Secretary of Commerce Harry L. Hopkins, who six months ago as WPA Administrator was talking in terms of millions for relief, turned last week to forecasting that the national income will rise by $6,000,000,000 to $8,000,000,000 in 1939. Hopkins, who said he had been conferring with Treasury officials in the interest of removing tax levies which are disturbing to business, denied that there was anything new about the Administration's so-called business appeasement program and that it has continued to work in the direction of aiding business since its inception in 1933. He explained, however, that Administration promises made to business in recent weeks would be backed up with action.

Harrison Sees President

Senator Pat Harrison, chairman of the Senate Finance Committee, emerged from the White House executive offices with the statement that the tax question had been discussed and that further conferences would follow. Whether President Roosevelt is ready to recommend repeal of the undistributed profits tax, which last session was modified to a 2½ per cent rate in a move opposed by Mr. Roosevelt, was not disclosed but the President declined to commit himself on that question two weeks ago, protesting that he would first have to study figures to ascertain the current yield from the undistributed profits tax.

The Senator from Mississippi also represented the President as being "in sympathy" with a curtailment of Government spending "if it can be done." Harrison, who clashed openly with the President last session over the undistributed profits tax, said he gave Mr. Roosevelt "my viewpoint,, very frankly and candidly and fully on cuts in Governmental expenditures."

There were also indications this week that some inner circle New Dealers were opposing the Administration's recently announced attitude toward business, claiming that it was, in effect, "a surrender" to a group to which they would give no quarter. They were understood to be anxious to persuade Mr. Roosevelt that he should proceed with caution in his so-called appeasement program.

How About Spending

But irrespective of this attitude, it has been conceded that Harry Hopkins' speech at Des Moines, presumably reflecting the Administration's intentions for the remaining 20 months of its term, leaves little more to be hoped for by industry if these intentions are carried out to the letter. Mr. Roosevelt's inferences relative to tax policies and his move to bring about a labor truce, and Secretary of the Treasury Morgenthau's announcement that progress is being made in developing the Administration's business-aid tax program are expected to have salutary results.

But despite all these assurances, many believe that hope for a well-rounded business recovery as promised by the Administration is futile unless a halt is called on large-scale Government spending.

CIO Offers to Help Repair Burned Plant

CHICAGO—Aid in rehabilitation work following the $250,000 fire last week at the Northwestern Steel & Wire Co., Sterling, Ill., was offered by 1200 CIO employees, who were willing to donate one day's work each week for a month. J. C. Foster, president of the company, declined the offer, which union officials said was prompted by their desire to cooperate and also to shorten the time necessary for some men to be out of work.

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THIS TIME IT'S ANOTHER NEW "AUTOMATIC"

Center-Control Fork Truck • Front Wheel Drive • Available Now In Capacities 4,000 to 6,000 Pounds in Telescopic or Non-telescopic Models • Available Before in Capacities 7,000 to 30,000 Lbs.

Here again is the ONLY Industrial Fork Truck which has ALL the New ALL-STAR features so essential and vital for Modern Mechanized Materials Handling.

This *New* "AUTOMATIC" Center Control Fork Truck makes possible for the first time IMPROVED "AUTOMATIC" SYSTEMS for unit load transportation . . . multi-stacking . . . loading and shipping which can be developed with utmost speed and precision . . . efficiency and economy . . . safety and flexibility.

VERSATILITY

This *New* "AUTOMATIC" Center-Control lift truck can be equipped with standard or special forks, rams, scoops, revolving roll mechanism and other special attachments to suit *your* individual requirements.

It is *YOUR* answer to *YOUR* Material Handling Problems.

No doubt you have a material handling problem to which this new "AUTOMATIC" can be successfully applied as a system. To eliminate needless expensive handling. To increase storage capacity. To cut material production costs To simplify inventory

What the "AUTOMATIC" system has done successfully, profitably for other concerns, it can do for you.

In NO other competitive fork truck, conventional or otherwise, will you find ALL the ALL-STAR "AUTOMATIC" features such as these.

★ **CENTER-CONTROL**

For unobstructed operating visibility with safety and accuracy

★ **ALL-WELDED FRAME**

Rigid box type deep sectioned construction of exceptional strength and stability.

★ **COMPACT DESIGN**

Every inch of space accounted for with accessibility to all parts. Shortest wheelbase, overall length, height, width and turning radius and aisle operation possible.

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Proper load distribution fore and aft. Perfect balance. Excessive counterbalancing dvoided. Maximum *Active* Pay load attained with *Minimum Dead* weight.

★ **SOLID MACHINED UPRIGHTS**

Deep channel sections of high tensile steel. Lower and upper sections RIGIDLY CROSS-BRACED for perfect alignment LATERALLY—LONGITUDINALLY

Already in a comparatively short time this *New* "AUTOMATIC" has won a nationwide acceptance as the *New Leader* in Industrial Fork Trucks.

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Have high factor of safety with built-in neutralizing device to prevent chain oscillation.

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Spur gear DRIVE • LIFT • TILT. Each designed for highest efficiency with minimum current consumption. All gears run continuously in oil.

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Precision type bearings shielded against foreign matter

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Perma-sealed dirt proof castings. Ball bearing joints mounted with self-compensating wear feature.

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Fully equalized with castor type trail wheels for shockless right angle steering.

★ **"ROTOR-BRUSH" CONTROLS**

Group mounted for dependable precision control of every unit.

★ **DYNAMIC FORK SPEED CONTROL**

Electro-interlock for safe control of lowering speeds.

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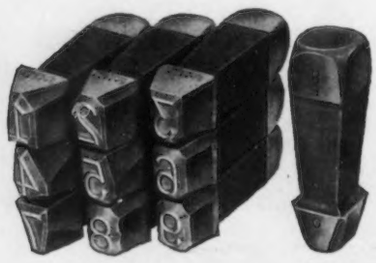

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State Wage-Hour Bills More Drastic Than Federal Law

WAGE and hour bills patterned after the Federal Fair Labor Standards Act of 1938, but more drastic in some of their provisions, have been introduced in the legislatures of most of the states, and many of the industrial organizations are taking steps to bring about their defeat or their modification.

A "model" bill for enactment by the states was sent out by the U. S. Department of Labor. State laws are intended to supplement the Federal act. While in its general framework, the "model" bill follows the pattern of the Federal enactment, it goes farther than the Federal law in several particulars, among them these:

The state bill does not contain exemptions as to certain types of industries and employees, such as administrative employees, outside salesmen, retailing and service industries, electric street railways, buses, and canning and preserving industries within the area of production of agricultural commodities.

The state bill sets no limit on wage minima that might be fixed by the commissioner as a result of recommendations by wage boards which would correspond to industry committees under the Federal setup.

The state bill provides specifically that wages may not include tips and gratuities.

It sets a maximum of 8 hr. a day in addition to the weekly maximum and provides for the payment of overtime for all work in excess of the hours specified.

Further, the state bill makes no provision, as does the Federal act, for overtime without time-and-a half compensation in seasonal industries (for 14 weeks in a year) and overtime without extra pay under specified types of bona fide labor agreements if the six-month or yearly total hours do not exceed 1000 or 2000 respectively.

An employer engaged in interstate business would be subject to both Federal and state legislation, the latter taking precedence in instances where the state legislation established higher minimum wages or lower minimum hours than the Federal act.

This state bill is said to have had the approval of the fifth national conference on labor legislation, a labor organization, held in Washington last November.

National Stronger Than Ever Before, E. T. Weir Reports

PITTSBURGH—National Steel Corp.'s net earnings for 1938 amounted to $6,661,652, equal to $3.03 a share on common, compared with $19,516,893 or $9.00 a share in 1937, and the company's balance sheet this year sets forth the most satisfactory position attained since the formation of the company, E. T. Weir, board chairman, told stockholders last week.

National Steel's net sales in 1938 amounted to $89,503,232, compared with $145,933,348 in 1937. The corporation's payroll in 1938 amounted to $27,608,885, compared with $39,254,007 in 1937, while the average number of employees in 1938 was 17,623 against 19,983 in 1937.

The company at present is enlarging and improving the structural mill and other finishing facilities of the Weirton Steel Co. in Weirton, W. Va., and Steubenville, Ohio, with these expenditures to total $5,200,000, according to Mr. Weir. National's inventories at the end of 1938 were valued at $27,943,915 as against $31,531,798 a year earlier.

Willys-Overland Sales Double February, 1937

TOLEDO—Factory sales of Willys-Overland cars in February were 99.79 per cent over February, 1937, reports Joseph W. Frazer, president. In the last three months of 1938 when change-over to the new models was effected, net sales were $2,750,732 and the plant operations resulted in net loss of $406,678. During the last year the company paid out $2,436,000 in wages and spent $5,569,010 for materials, with about one-fifth of this going to 79 Toledo firms.

Bondholders Elect Woodward Directors

BIRMINGHAM—Bondholders of the Woodward Iron Co., Woodward, Ala., have reelected five directors, who represent the bondholders. Those reelected were Oscar Wells and Herbert Tutwiler, Frederick Ayer, Oliver D. Filley and Lewis S. Morris. Under terms of reorganization of the Woodward Iron Co. two years ago, bondholders elect a majority of the directors until 50 per cent of the bonded indebtedness is retired.

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IF you have a "sick hoist" falling down on the job, liquidate it! Let this new heavy-duty R & M take over and carry on—for the next twenty years or so!

This new hoist has an all-steel frame, with built-in steel trolley and safety lug. It's modern to the last detail—but low in cost.

If you want an installation that won't go sour, if you like to work with an organization that believes in being helpful—get in touch with R & M. Our engineering department is at your service.

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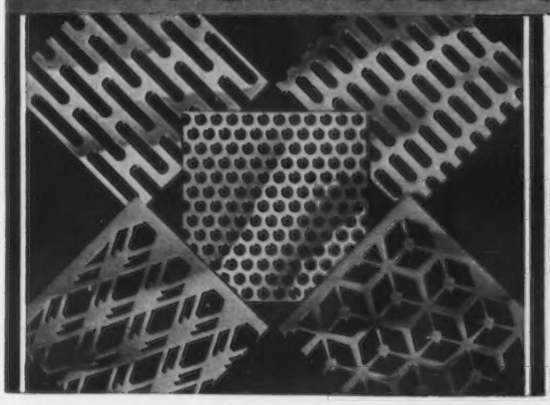

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It's *quicker*, and more economical to use BISCO alloy and Tool Steel Tubing. You can get any diameter up to 14 inches. There are standard sizes for every requirement.

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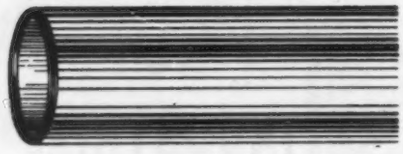

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THE BISSETT STEEL COMPANY

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CLEVELAND, OHIO

ORDER FROM STOCK

Orders Gain, Stettinius Tells U. S. Steel Corp. Stockholders

STEEL orders, production and shipments during January and February have shown some improvement over the December average, and are substantially better than during the corresponding months of 1938, Edward R. Stettinius, Jr., reported this week to United States Steel Corp. stockholders.

Last year, in which U. S. Steel's volume of business declined 45 per cent to $766,673,753 from $1,395,549,630 (in 1937), takes rank as a "major depression year" in which his company's net loss of $7,717,454 is less than might reasonably have been expected, the corporation's chairman said.

"This striking reversal . . . is attributable primarily to the heavy decline in tonnage volume in the consumer demand for steel, coupled to a very considerable extent with a dislocated price condition in certain important lines of finished steel products," Mr. Stettinius continued. While selling prices were lower, costs of materials, labor, services and taxes were higher, he said. Highlighting U. S. Steel's 1938 pamphlet report were comparative figures such as:

	1938	1937
Gross sales to customers	$560,508,303	$964,397,615
Revenue from carriers	52,574,864	96,098,001
Total taxes	48,842,131	88,048,237
Total payroll	282,209,332	442,927,683
Total paid in pensions	8,149,737	7,821,958
Net loss (income in 1937)	7,714,454	94,944,358
Net working assets	433,171,649	366,083,611
Output, steel ingots, castings (tons)	9,397,371	18,532,278
Plant operations average	36.2%	71.2%
Finished shipments (tons)	6,655,749	12,748,354
Average number employees	202,108	261,293
Average hourly earnings	90.2c.	86.4c.
Common stockholders	168,399	164,442
Hr. worked per week	29.71	37.63

The U. S. Steel report, referring to the continuance of satisfactory employee-employer conditions, noted that expiring union agreements had been renewed. Said Mr. Stettinius: "They are subject to change upon 10 days' notice from either party, and to termination, if changes are not agreed to, within 20 days of the notice; thus affording, so far as possible, an opportunity for the adjustment of operating to varying economic conditions."

"Prices for steel products," said the U. S. Steel chairman, "were fairly steady until the middle of the second quarter, but were subsequently subjected to substantial reductions and readjustments. On June 24, 1938, certain of the subsidiary companies announced lower prices on many of their products, these reductions varying in amount depending partly upon the products and partly upon the point of manufacture. The new prices were approximately on the same level as the prices in effect prior to 1928, and were made to meet a competitive condition and with the hope that such reductions would stimulate a demand for steel products.

"Prices actually realized for steel products shipped to customers by the

Comparison of Various Items Produced Last Year Compared With 1937

	1938 *Tons*	*1937* *Tons*	*Decrease* *Tons*	*Per Cent*
Iron ore	10,890,468	30,286,632	19,396,164	64.0
Manganese and zinc ores	94,003	141,669	47,666	33.6
Coal	13,841,727	24,503,805	10,662,078	43.5
Coke	7,005,696	14,189,725	7,184,029	50.6
Limestone, dolomite, fluorspar and cement rock	6,980,314	13,121,491	6,141,177	46.8
Pig iron, spiegel and ferromanganese	6,814,252	14,438,549	7,624,297	52.8
Steel ingots and castings	9,397,371	18,532,278	9,134,907	49.3
Rolled and finished steel products for sale	6,562,948	12,762,267	6,199,319	48.6
Cement (bbl.)	10,695,500	12,731,347	2,035,847	16.0
Zinc	51,274	66,687	15,413	23.1
Sulphate of iron	14,539	23,283	8,744	37.6
Ground basic slag (soil conditioner)	74,343	54,133	*20,210	*37.3
Ammonia (in sulphate equivalent)	118,646	214,853	96,207	44.8
Benzol products	101,034	197,447	96,413	48.8
Gypsum	53,249	59,975	6,726	11.2

*Increase.

3 "WAYS" *agree on* 1 FACT

MODERN METALS REDUCE OPERATING COSTS

RAILWAYS

General Motors' use of Nickel alloyed iron in Diesels for these Santa Fe streamliners cut weight per H.P. Nickel-chromium iron is tougher, retains strength at high temperatures, and wears longer.

Railways, highways and waterways present varied operating problems. But each transport system agrees operating costs can be reduced by utilizing modern materials—such as Nickel alloyed cast irons.

For new equipment or replacement parts, take full advantage of the money-savings made possible by modern metallurgy and engineering. Make each ounce, each inch of metal carry bigger loads, resist harder wear, by specifying the correct alloy strengthened and toughened with Nickel.

WATERWAYS

23-inch dredge liners used at Ft. Peck Dam. Under identical conditions the liner at left above, rolled from plain steel wore out after handling less than 1½ million cubic yards. The liner at right above cast from Ni-Hard — the abrasion-resistant Nickel iron—withstood 2-1/3 million yards and after inspection it was put back in service to add millions more yards to its career.*

Mack Mfg. Corp. casts these heavy duty truck cylinder blocks in their own foundry from Nickel alloyed iron. Nickel increases machinability, permits drilling at speeds 1½ times faster than in other irons of same hardness.

NICKEL CAST IRONS

HIGHWAYS

*Reg. U. S. Pat. Off. by The International Nickel Company, Inc., Canadian Patent No. 281268

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

corporation's subsidiary companies in 1938, compared with prices realized in 1937, based on an equal tonnage for both years of the respective principal classes of steel products shipped, averaged somewhat less in 1938 than in 1937," Mr. Stettinius said.

In 1938 the corporation operated at an average of 36.2 per cent of capacity, the quarterly averages being as follows: First, 32.3 per cent; second, 31.4 per cent; third, 34.2 per cent; fourth, 46.9 per cent.

The pamphlet report gives the comparison as shown on page 62, of the corporation's production of various items last year compared with 1937.

Birmingham Chosen for A. I. S. E. Spring Meeting

THE Association of Iron and Steel Engineers will hold its spring meeting in Birmingham on March 27 and 28. Fred M. Sturgess is chairman of the association's Birmingham Section.

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THE FOE OF PROFITABLE PRODUCTION

Modern production is stream-lined. It must go places fast, and do an efficient and economical job. Being able to shave costs with better machinery many times means landing an important order.

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Throw out obsolescent machinery that is keeping you from heading the parade. Installing new and up-to-the-minute Stearns magnetic equipment will prove a definitely profitable investment, paying for itself many times.

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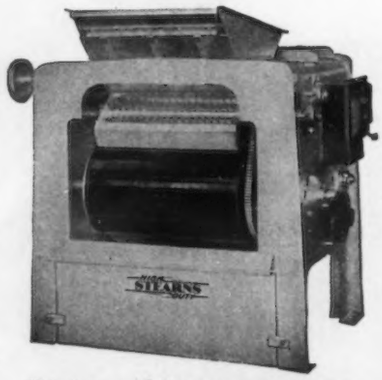

This improved Stearns magnetic separator replaced an obsolete machine with gratifying results in a prominent midwest industrial plant. Name on application.

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HIGH STEARNS DUTY
LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

635 So. 28th Street **Milwaukee, Wis.**

Reich's Farm Tool Exports Down 11%, Ours Off 47%

WASHINGTON—The Machinery Division of the Department of Commerce reported this week that Germany's export trade in agricultural implements and machinery in 1938 reached a value of $17,975,000, an increase of 11 per cent over the comparable trade of $16,163,000 in 1937.

The department noted that the 1938 figure is only 17 per cent below the 1929 value of $21,757,000 and added that "this is a factor to be taken into account when considering the extent of Germany's competition with American products in foreign markets."

Total farm equipment export trade of the United States during 1938 totaled $75,435,000 or slightly more than half the 1929 value of $140,801,000. The greater recovery of Germany's foreign sales in recent years, however, has reduced our export lead, the department said. The ratio in dollars of American to German exports in 1929 was approximately 7-1, compared with 5-1 in 1937 and 4-1 in 1938.

Westinghouse Subsidiary Buys Iron City Electric Co.

WESTINGHOUSE ELECTRIC SUPPLY CO., subsidiary of Westinghouse Electric & Mfg. Co., has acquired the electrical business of the Iron City Electric Co., Pittsburgh, according to Bonnell W. Clark, president, Westinghouse Electric Supply Co. Warren I. Bickford, former secretary and treasurer of the Iron City Electric Co., is to become district manager of the Westinghouse Electric Supply Co., and Charles W. Ridinger, former president, will act in an advistory capacity.

Pittsburgh Firm Doubles Force Despite Order Lag

PITTSBURGH—In an effort to help reduce welfare rolls by temporary employment, Hubbard & Co., pole line hardware manufacturers, has doubled its working force. The increased employment is not justified by the present rate of business according to the company, but production will be stepped up and products kept in warehouses until demand materializes. A pick-up in business might make these temporary positions permanent, according to the company. The increased schedule will raise employment to more than 600 workmen, compared with a peak of 1200 in late 1936.

SWOC Loses Election In Eagle Mfg. Co. Plant

WASHINGTON — Because the SWOC and Lodge 1318 of the Amalgamated Association of Iron, Steel and Tin Workers lost by a 96 to 85 vote in a secret ballot election conducted Feb. 16, at the Eagle Mfg. Co., Wellsburg, W. Va., the National Labor Relations Board has dismissed a certification petition filed by the SWOC. The NLRB also announced it would conduct an election within 30 days among workers of the Central Ohio Products Co., Galion, Ohio, to determine whether they desire to be represented by the AFL machinist union.

The Board dismissed a petition filed by the Steel Workers Organizing Committee, Local 2032, on behalf of employees of the Superior Sheet Metal Works, Indianapolis, Ind.

1000 Miles of Elevated Roads Reported Planned In U.S.

SAN FRANCISCO—Elevated highways would relieve congestion and save the public millions of dollars by reducing accidents, fuel consumption and travel time according to conclusions reached by a special committee which reported to the American Road Builders' Association convention here. The report enumerated various elevated highways already built and discussed plans for additional elevated highways already drawn. These plans, it was stated, call for the erection of at least 1,000 miles of elevated highways for the relief of traffic congestion.

January Wages In 25 Industries $25.95 Weekly

NEW YORK—Average weekly earnings in the productive industries were 0.3 per cent lower in January than in December dropping to $25.95 from $26.02, according to latest reports from 25 manufacturing industries analyzed by the statistical division of the National Industrial Conference Board. Real weekly earnings, or actual weekly earnings adjusted for changes in the cost of living rose 0.2 per cent in January, 1939, as compared with December, and were 16.3 per cent higher than in January, 1938. Hourly earnings averaged about 72 cents in both December and January. The average work week of wage earners in 25 manufacturing industries in January was 36.6 hr.

Allegheny Regional Board Loading Estimate Coming

PITTSBURGH—The Allegheny Regional Advisory Board meets here March 16 at the 12th annual meeting, when members will discuss and estimate carloadings to be involved in second quarter shipments. F. R. Dick, investment banker, Dick & Merle-Smith, New York, will address the group on "Peanuts, Bananas & Railroads, or The Injustice of the Multiplication Table," a discourse on the current railroad problem.

Westinghouse Equips Sheet & Tube's 54-in Mill

PITTSBURGH — Westinghouse Electric & Mfg. Co. will furnish complete auxiliary and main drive equipment for Youngstown Sheet & Tube Co.'s 54-in. continuous hot mill now being built at Indiana Harbor. Westinghouse is also preparing electrical installation plans for the hot strip mill and is building metal clad switchgear for a new cold mill at Youngstown Sheet & Tube Co.'s Indiana works.

Complete Heating Equipment for making Butt-weld Pipe by the Fretz-Moon Continuous Process in sizes from ½" to 3½".

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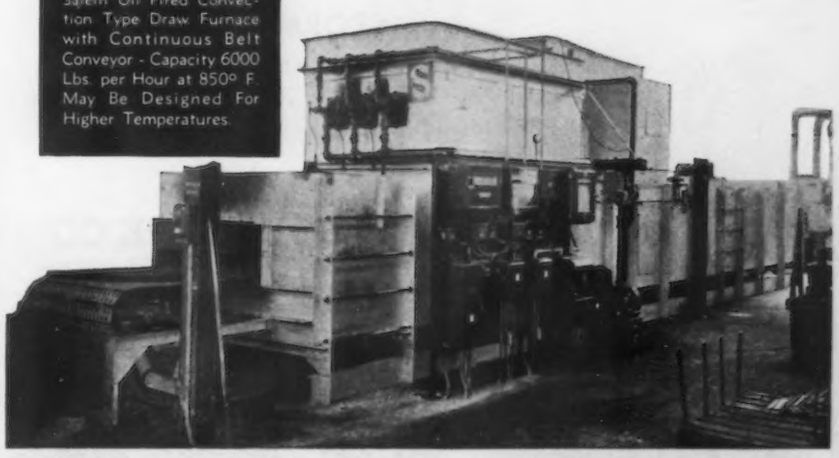
Salem experience on furnaces for Heat Treating, Billet Heating, Forging, Brazing, Pipe Making and "Salem" Circular Soaking Pits offers much that may help to meet specific conditions in your own work. Asking to have a qualified representative talk with you entails no obligation.

Salem Oil Fired Convection Type Draw Furnace with Continuous Belt Conveyor - Capacity 6000 Lbs. per Hour at 850° F. May Be Designed For Higher Temperatures.



SALEM, OHIO,—CHICAGO - DETROIT - NEW YORK - PITTSBURGH - LONDON - PARIS - BERLIN - WELLAND, ONT.

SALEM ENGINEERING COMPANY

. . . PERSONALS . . .

H. B. JORDAN

HARVEY B. JORDAN has been appointed vice-president of the American Steel & Wire Co., U. S. Steel Corp. subsidiary. He will be in charge of operations, succeeding M. W. REED, who has been made chief engineer for Carnegie-Illinois Steel Corp.

Mr. Jordan first became associated with the American Steel & Wire Co. during the summer vacation of 1914 as a chemist at Central furnaces and docks in Cleveland. In June, 1915, after leaving Penn State College, he was employed by the company as clean-up foreman at the Cleveland plant. He later became first general foreman, then assistant superintendent and in April, 1929, became superintendent of the plant. In May, 1933, he was transferred to the vice-president's office, doing field work, and in February, 1934, was promoted to manager of the metallurgical department, which position he held until being made manager of the Cleveland district in December, 1935. He was named assistant vice-president in January, 1937.

C. H. BUTTERFIELD

CHESTER H. BUTTERFIELD, heretofore general sales manager of the locomotive equipment division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has been appointed vice-president and general sales manager of the company, succeeding the late W. P. Bradbury. Mr. Butterfield started with the company in 1917 in the engineering department of the Hancock valve division at Boston. In 1925 he was made sales representative of the railroad division in New England and four years later became assistant works manager of the valve division. In 1931 he became sales manager of that division and in 1934 was promoted to the post he held before his present appointment.

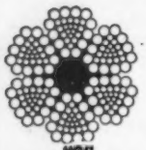
❖ ❖ ❖

C. E. STENSON has been elected president of the Youngstown Steel Tank Co., Youngstown, Ohio, formerly the Youngstown Boiler & Tank Co. He joined the company in 1933 as a sales representative after 20 years with the Petroleum Iron Works. In 1937 he was made vice-president and assistant treasurer.

❖ ❖ ❖

PAUL F. KAVANAGH has been appointed sales engineer of the Gordon Lubricators Division of Blaw-Knox Co., Pittsburgh. Mr. Kavanagh, educated at Carnegie Institute of Technology, was formerly with Koppers Construction Co., Pittsburgh; Austin Co., Dallas; Dwight P. Robinson Co., Los Angeles, and for the past five years has represented DeLaval Sales

Style B Flattened Strand


"H" Flattened Strand

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Steel Clad

You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

—PREFORMED—

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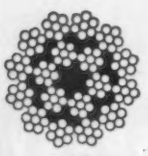
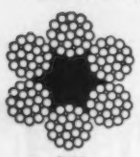
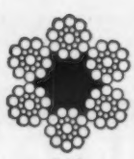
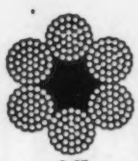
* Reg. U. S. Pat. Off.


18x7 Non-Rotating


6x19 Filler Wire


6x19 Seale


6x37 Extra Flexible

8x19 Extra Flexible

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BETWEEN THE PRECISION BENCH TYPE LATHE AND THE SMALLER TOOL ROOM LATHE *with the*

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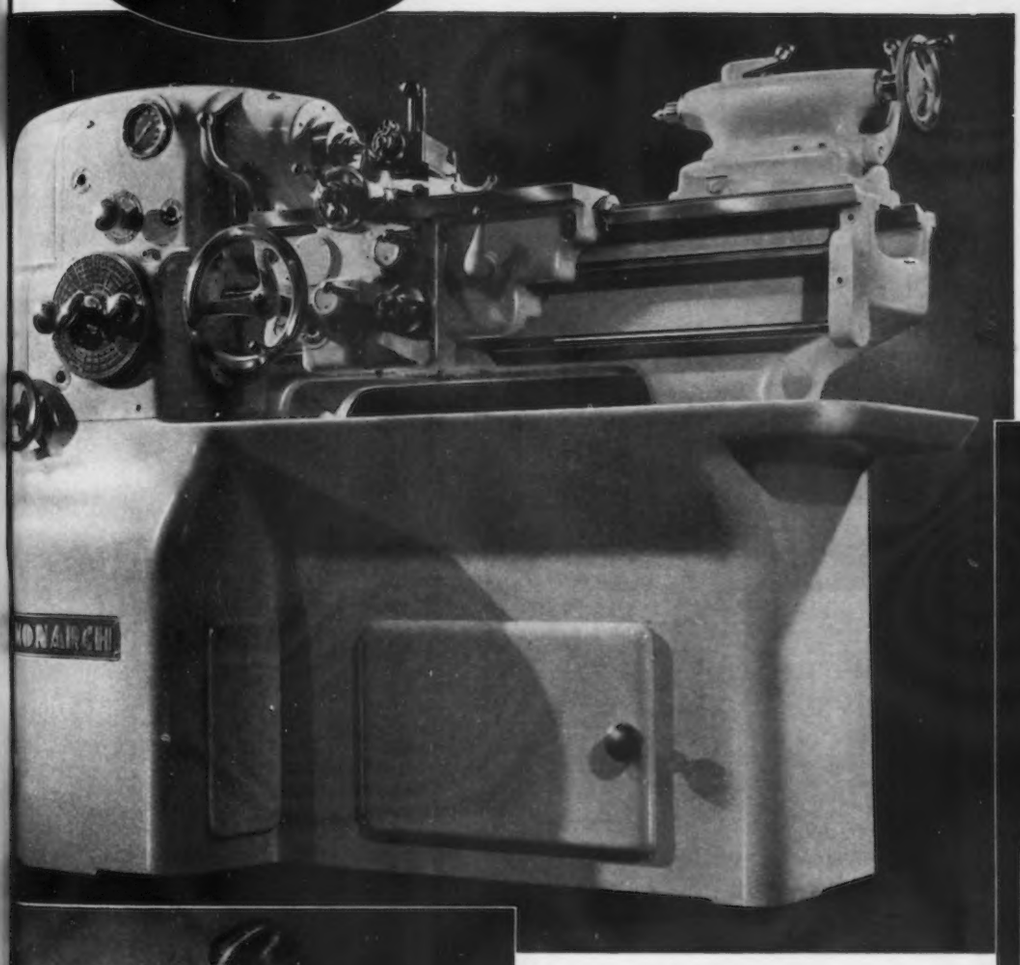
10" SENSITIVE PRECISION LATHE!

AS Monarch engineers worked out plans for this most complete and up-to-date of small precision tool room lathes, they decided to design it in such a way as to achieve a modern effect. Protruding and unsightly levers and gadgets were re-designed and were either removed or replaced with more modern and more efficient methods of accomplishing their purpose. The result is a truly streamlined lathe whose flowing lines not only please the eyes, but whose features and advantages give a finer type of performance.



The last word in industrial design, this bench precision 2 H. P., 2000-pound lathe has many exclusive and outstanding design features. They include: Almost unlimited range of gearless, stepless spindle speeds ...forward and reverse—Wide range of threads and feeds, through enclosed quick-change gear box, which is operated by one hand—Carriage held in secure alignment to the non-wearing and ground bed ways, by five self-aligning ball bearings, which are mounted on eccentric studs—Anti-friction bearings used throughout, etc.

An all-color motion picture film showing the complete FLAME HARDENING process in detail, as well as a film showing the application of AUTOMATIC SIZING to Monarch lathes, is available. If you desire to see a showing at your plant, just write us to this effect. No obligation.

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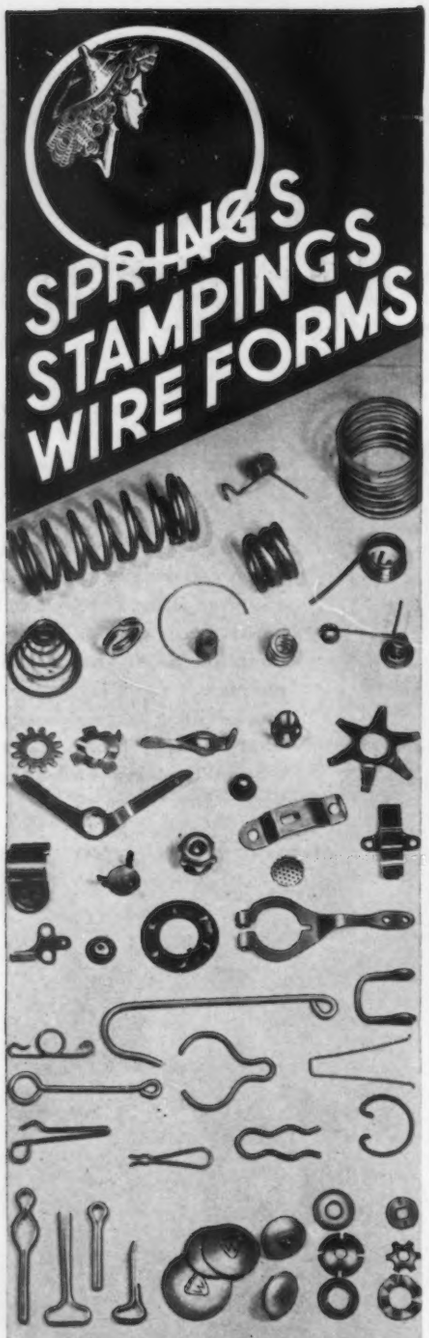

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Are you up against a "stickler"—one of those design or production problems that does not quite work out? Hubbard has been solving them for hundreds of customers, with just the right part for the job.

Write us about your problem; send in your drawings or samples. Let us furnish suggestions and quotations.

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& Service, having been engaged in engineering, selling, and installing lubricating systems in England, Russia, and in this country.

❖ ❖ ❖

JAMES H. ROBINS has been elected president and a member of the board of the American Pulley Co., Philadelphia, succeeding CHARLES E. BRINLEY, who has resigned after an association of 37 years with the company to become president of the Baldwin Locomotive Works. Mr. Brinley will be

J. H. ROBINS

associated with the Pulley company as chairman of the board.

❖ ❖ ❖

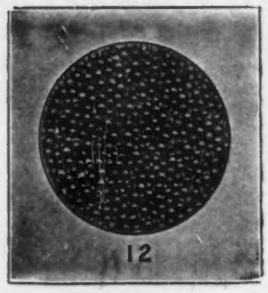
GEORGE C. BRAINARD, chairman, Cleveland Federal Reserve Bank, and president General Fireproofing Co., Youngstown, has been elected a director of Addressograph - Multigraph Corp., Euclid, Ohio, to succeed SAMUEL M. HASTING, who has resigned.

❖ ❖ ❖

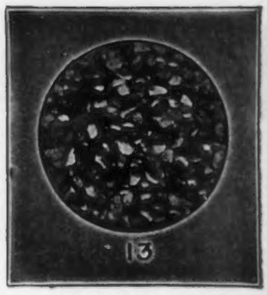
G. P. KENNEDY has been appointed resident production engineer of the Muskegon Heights (Michigan) plants of Norge Division of Borg-Warner Corp., succeeding CARL BAKER, who is now chief cabinet engineer for the Norge plants in Detroit.

❖ ❖ ❖

ROY C. MUIR, vice-president of the General Electric Co., Schenectady, N. Y., in charge of engineering, is one of four graduates of the University of Wisconsin selected by the board of regents to be conferred honorary de-



SHOT



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Saving 10 per cent

Saving 15 per cent

Saving 25 per cent

These are the statements made to us and our representatives in all parts of the country from Concerns who are today using our Heat-Treated Shot and Steel Grit. Our list of regular customers reads like the blue book of the Automotive, Grey Iron, Malleable Iron and Drop Forging Companies. Our heat-treating insures the customer shot and grit tough and strong, and of uniform quality the year round. The test is in the machine.

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Any size of shot or grit, a ton, or a carload, promptly shipped.

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grees at the annual commencement exercises in June. Mr. Muir, who was born in Arcadia, Wis., and was graduated from the Wisconsin college of engineering, will receive the honorary degree of doctor of engineering.

❖ ❖ ❖

J. L. HYLAND, Chicago district operating manager, Republic Steel Corp., has been named chairman of the board of directors of the Greater Chicago Safety Council.

❖ ❖ ❖

WILLIAM L. DITGES, who has been identified for the past four years with the Mesta Machine Co., Pittsburgh, has been appointed chief engineer of the Morgan Engineering Co., Alliance, Ohio. He has been associated with the steel industry in various capacities since graduation from college, having been employed in the engineering departments of both the Carnegie Steel

W. L. DITGES

Co. and Bethlehem Steel Co. In 1916 he joined the engineering staff of Mackintosh-Hemphill Co., and advanced successively to the positions of chief engineer and vice-president.

❖ ❖ ❖

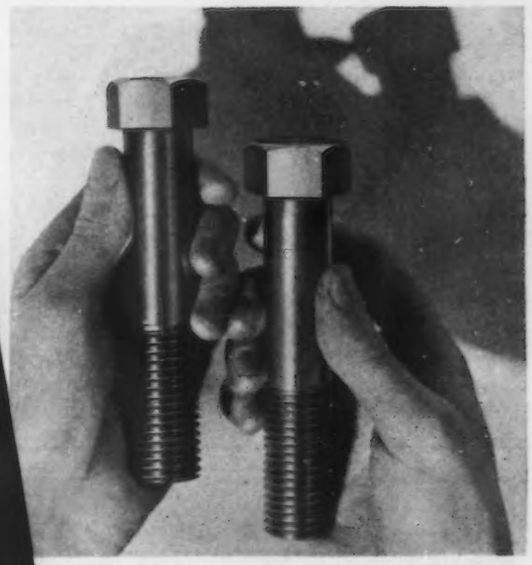
R. B. TRIPP, sales manager of the Ohio Forge & Machine Corp., Cleveland, has been elected vice-president of the company, succeeding the late J. M. Clem. Mr. Tripp will retain his position as sales manager.

❖ ❖ ❖

E. L. BARTHOLOMEW, who has been connected with the United Shoe Machinery Corp., Beverly, Mass., for the past 23 years, has been appointed chief

BY THE BOX OR BY THE MILLION

Similar IS NOT THE WORD FOR IT » » THEY ARE identical



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It forms readily - It is rust resistant and has an ideal surface for painting

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SUPERIOR
THE SUPERIOR SHEET STEEL CO.
CANTON, OHIO
Division of Continental Steel Corp., U. S. A.

engineer. For 10 years he was open-hearth and mill superintendent of the Tremont Nail Co., a subsidiary.

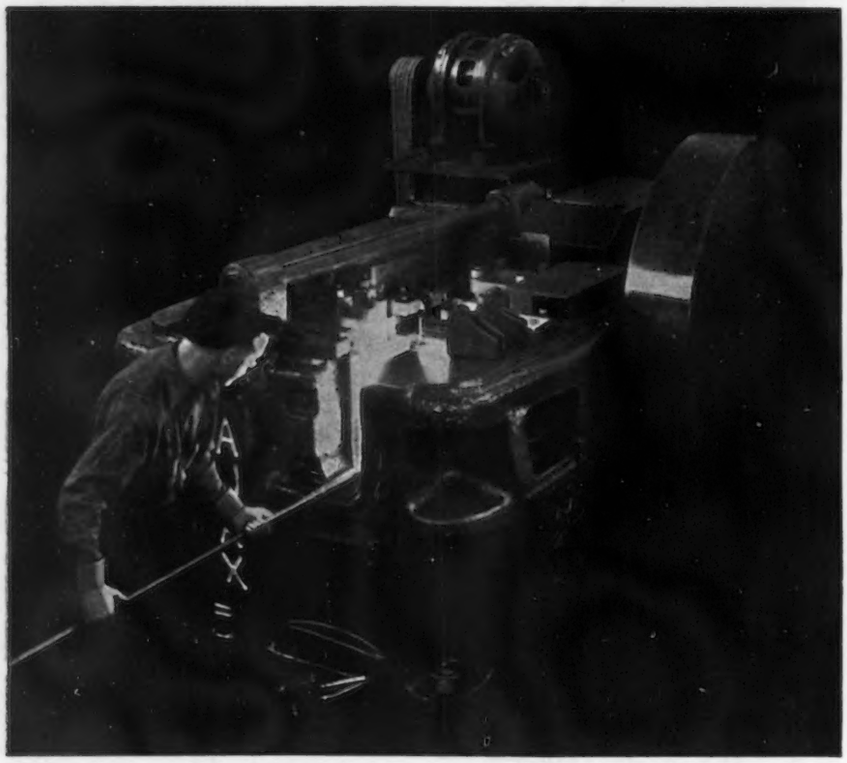
J. V. BAXTER has been appointed superintendent of inspection, including the control of materials and mechanical specifications. He has been with the company for eight years.

❖ ❖ ❖

N. K. VAN OSDOL, for several years assistant to the president of the Borg-Warner Corp., Chicago, has been appointed Detroit and eastern Michigan sales representative for the Ingersoll Steel & Disc Division of Borg-Warner. He will make his headquarters at 6432 Cass Avenue, Detroit.

❖ ❖ ❖

C. I. RITCHIE, for the past five years a member of the staff of the Gray Iron Founders' Society, Inc., Cleveland, has been designated executive secretary of the society. He has had a wide experience in the gray iron foundry field, particularly in foundry cost accounting and plant engineering.



FOR EXACTING UPSET FORGING

● Ajax Air Clutch Forging Machines are particularly suitable for difficult upsetting and punching operations.

The excellent header slide and die slide alignment of Ajax machines, because of the extension guide bearings, and the great rigidity of frame, both longitudinal and transverse, provide the accuracy so essential, not only for sound stock-gathering operations, but also for piercing.

The operating convenience and the instantaneous response of the Ajax Air Clutch to tripping give speed which permits performing the maximum number of operations on the slender stock before it cools, eliminating or reducing re-heats and re-handlings resulting in maximum output.

Write for our Bulletin No. 65-A.

THE AJAX MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND
621 MARQUETTE BLDG., CHICAGO • 201 DEWART BLDG., NEW LONDON

AJAX

JAMES HENDERSON, for 45 years associated with the technical development of the Frodingham Iron & Steel Co., England, at present deputy chairman of the renamed Appleby-Frodingham Steel Co., Ltd., and a director of the United Steel Companies, Ltd., has been awarded the Bessemer gold medal of the (British) Iron and Steel Institute. He is a past-president of the British Iron and Steel Federation and of the Lincolnshire Iron and Steel Institute.

❖ ❖ ❖

W. C. TREADWELL, who has been New England representative for several years for Maas & Waldenstein Co., Newark, N. J., has been placed in charge of the upper New York State territory, with headquarters at Rochester.

❖ ❖ ❖

DAVID POLLOCK, of the Mayer Pollock Co., Pottstown, has been appointed chairman of the industrial relations committee of the Institute of Scrap Iron and Steel, New York. JACK R. FORCHEIMER, of the company of the same name, St. Louis, has been appointed chairman of the traffic committee of the institute.

❖ ❖ ❖

ELWIN M. STRICKLAND has been placed in charge of the newly-opened Detroit branch office, at 7376 Grand River Avenue, of the McKenna Metals Co., Latrobe, Pa.

❖ ❖ ❖

N. B. MCKEAGAN has been made resident manager of the Chicago office and warehouse of the Peninsular Steel Co., at 4532 West Palmer Street.

❖ ❖ ❖

RALPH F. HEATH, formerly representative in New Orleans for Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has been made sales representative in Houston. JACK SCHUYLER who has been connected with the Los Angeles office of the company for the past five years, has been transferred to New Orleans.

❖ ❖ ❖

CHARLES THIEDE, chief tool engineer of the Jefferson Plant of Chrysler Corp., has been elected chairman of the Detroit chapter of the American Society of Tool Engineers. Other officers elected are: Vice-chairman, S. K. KUHN, of McCrosky Tool Co.; secretary, B. L. DIAMOND, of Modern Tool Co., and treasurer, LAWRENCE W. HOWE, of Lincoln Park Tool & Gage Co.

. . . OBITUARY . . .

ANTHONY HOENSHEID, vice-president of the Commercial Steel Treating Corp., Detroit, of which his son, Ralph Hoensheid, is president, was buried March 7. Mr. Hoensheid succumbed to heart disease in Cincinnati while driving home from a vacation in Florida. Born in Essen, Germany, 79 years ago, he had lived in Detroit since 1903. For 21 years, from 1903 to 1924, he was connected with the Detroit Twist Drill Co. as a heat treating engineer. Mr. Hoensheid was a charter member of the American Society for Metals.

❖ ❖ ❖

ELWOOD BURDSALL, since 1901 secretary-treasurer of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., died after a long illness at his home at that city on March 10, aged 82 years. He was a son of Elwood Burdsall, one of the founders of the company. He joined the company in 1878 after his graduation with a degree in mechanical engineering from Cornell University.

❖ ❖ ❖

DR. HENRY LOUIS, formerly professor of mining and metallurgy at a number of British universities, died recently at his home in Newcastle, England, at the age of 84 years. He was a member of the (British) Iron and Steel Institute, American Institute of Mining and Metallurgical Engineers, and was awarded the Bessemer gold medal of the Iron and Steel Institute in 1932.

❖ ❖ ❖

JOHN H. TEETOR, former president and one of the founders of the Perfect Circle Piston Ring Co., Hagerstown, Ind., died March 9. With his brothers and other members of the family, he was prominent in the automobile industry from its early days. He was 78 years old.

❖ ❖ ❖

SAMUEL T. BLEDSOE, president of the Atchison, Topeka & Santa Fe Railway Co. since 1933, died last week at his home in Chicago, aged 70 years. Mr. Bledsoe, a lawyer, first entered the railroad field as legal counsel for the Gulf, Colorado & Santa Fe Railroad in 1895. He served as chairman of the line's executive committee and general counsel from 1930 to 1933.

❖ ❖ ❖

WILLIAM RUSSELL, former Cincinnatian and foundry owner, died recently at his home in Ripley, Ohio. He was 85 years old. Until a few years ago, Mr. Russell was engaged with four of his sons in the operation of the Ripley Foundry & Machine Co.

❖ ❖ ❖

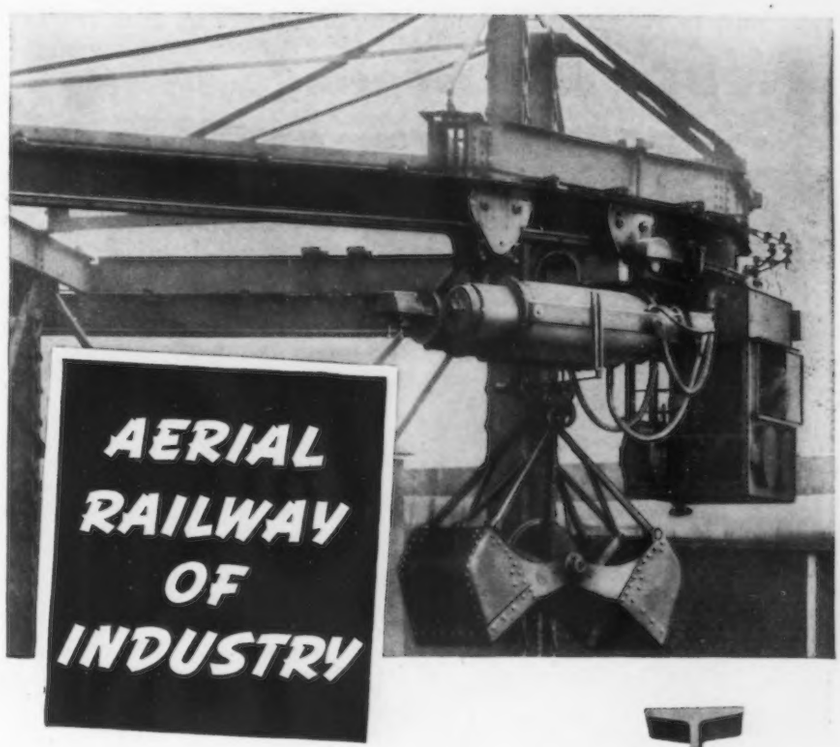
JOHN F. REGAN, JR., superintendent of the coke plant of Youngstown Sheet & Tube Co., Youngstown, died suddenly of a heart attack March 6, aged 55 years.

❖ ❖ ❖

MARSHALL B. WATERMAN, a director of the L. S. Starrett Tool Co., and for many years a member of the company and assistant superintendent, died at his winter home in Haines City, Fla., on March 9. Mr. Waterman was born in Barre 72 years ago.

❖ ❖ ❖

WILLIAM W. WILLOCK, aged 76, director, Jones & Laughlin Steel Corp., Pittsburgh, died March 8 at Syosset, Long Island. He became associated with Jones & Laughlin in 1895 as general manager of its subsidiary, the Monongahela Connecting Railroad and in 1901 became director and vice-



• One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Furnished with single or double hooks in capacities from ⅛ to 10 tons.

They are also ideally suited to the accurate control of any standard electromagnet or grab bucket.

Write for catalogs illustrating and describing the "Aerial Railway of Industry".

Shepard Track consisting of two special analysis T-rails clamped to the bottom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

356 SCHUYLER AVENUE . . . MONTOUR FALLS, N. Y.

president of that company. In 1902 Mr. Willock became a director of Jones & Laughlin Steel Corp., a position he held until his death.

❖ ❖ ❖

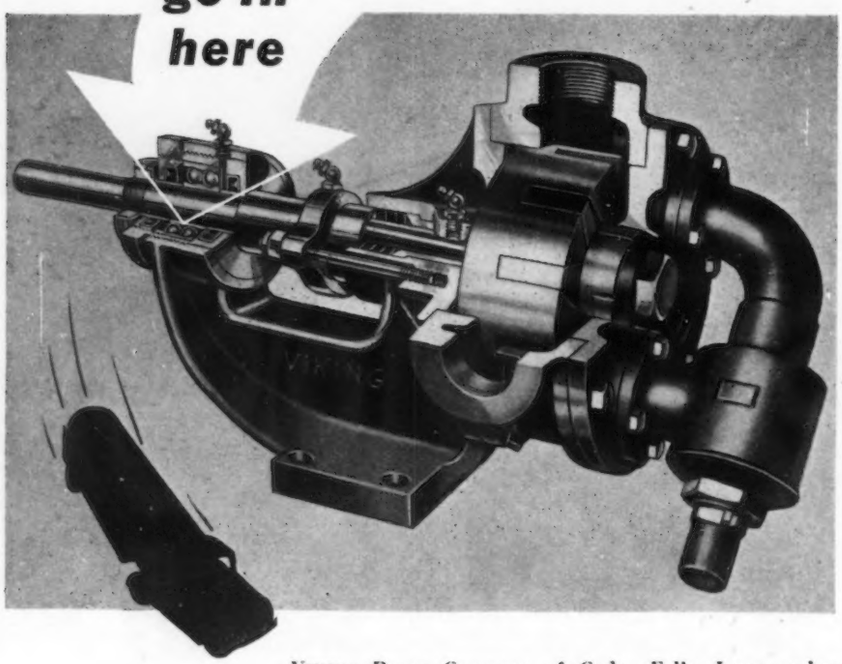
JOHN L. GREEN, president of Laclede-Christy Clay Products Co., St. Louis, died at his home there of heart disease. He was 65 years old. Mr. Green was born in St. Louis, the son of the late James Green, founder of the Laclede Fire Brick Co., who began the manufacture of fire brick in St. Louis in 1865. After attending Smith Academy and Western Military Academy, Mr. Green went to Princeton University, where he was graduated in 1897 with a degree of Civil Engineer. He began his business career in the employ of the Helmbacher Forge & Rolling Mill in 1898, and after five years, during which he advanced to the vice-presidency, resigned. He joined the Laclede Fire Brick Co., which was amalgamated in 1907 with the Christy Fire Clay Co., under the title of Laclede-Christy Clay Products Co., of which he was elected vice-president. In 1911, he was elected president of the company.

❖ ❖ ❖

FRED E. KEY, vice-president and general manager of the Key Co., East St. Louis, Ill., and the inventor of more than 30 devices used in power plants, principally in the oil industry, died of a heart ailment at a hospital in St. Louis.

"... built to withstand the rough, everyday usage on tank trucks"

so BCA Ball Bearings go in here



VIKING Pump Company of Cedar Falls, Iowa, makes rotary pumps for the tough, dirty, year-round job of truck oil delivery. Slung under the chassis of the big brutes that deliver fuel where it has to go, these pumps must be as right as they are rugged. As Viking says, they are "built to withstand the rough, everyday usage on tank trucks of all makes and sizes."

The Double-Row BCA Annular Ball Bearing, illustrated, has been built into the pump by Viking designers with the certain knowledge that it will stand up to the tough job—do its part to maintain Viking reputation.

Machine designers and engineers know they can count on BCA Ball Bearings to satisfactorily do the jobs for which they are intended. If you have a bearing application, let us help you select the right bearing for the job.

BEARINGS COMPANY OF AMERICA
511 HARRISBURG AVENUE, LANCASTER, PENNA.

BCA RADIAL · THRUST · ANGULAR CONTACT BALL BEARINGS

Lewis Reports Price Cuts Increased J. & L.'s 1938 Loss

PITTSBURGH—The net loss of $5,879,958 sustained in 1938 by Jones & Laughlin Steel Corp., compared with net profit of $5,266,157 for the previous year, was due primarily to the company's low operating rate in 1938. Other contributing factors, according to H. E. Lewis, board chairman, were the drastic price reductions by the industry which became effective the middle of 1938, elimination of basing point differentials, and establishment of additional basing points which followed the elimination of basing point differentials.

The company's gross sales and earnings for 1938 amounted to $75,410,901 compared with $135,273,044 in 1937. Its payroll in 1938 was $34,162,748, compared with $59,423,421 in 1937. Average number of employees in 1938 was 26,286 compared with 36,430 in 1937. Average ingot output for 1938 was 37 per cent of capacity against 67½ per cent in 1937. The average rate during the last six months of 1938 amounted to 46 per cent of steel ingot capacity.

Total taxes in 1938 averaged $4.18 per ton of finished steel, compared with $3.77 per ton in 1937.

Bellefonte Plant to Make Descaling Equipment

PITTSBURGH—The Sutton Engineering Co. is to manufacture and sell descaling equipment recently patented by J. M. Hilbish and J. K. McCahan. The machine, which was recently described in THE IRON AGE, page 33, issue July 14, 1938, removes rust or scale by the tumbling method from steel bars, shapes and pipe. A demonstration of the operations will be given the latter part of this month at the Sutton Engineering plant in Bellefonte, Pa.

Machine Has Caused "Enormous" Job Increase In U. S., Moulton Tells ASTE

DETROIT—Whatever may have been the social and moral consequences of technological developments, aggregate employment has been enormously increased, Dr. Harold G. Moulton, president, Brookings Institute, stated in his address on "Machinery, Employment and Living Standards," presented at the preview dinner of the Machine and Tool Progress Exposition of the American Society of Tool Engineers, held in Detroit, March 13. He illustrated by numerous examples how concern has always been expressed over the effects of such developments on employment and upon public health and social standards. In 1673, for example, the "grand concern" of England was the stagecoach, which at that time threatened the saddle industry.

During modern times, Dr. Moulton said, the total population has increased more rapidly than ever before, yet all have found employment. In the United States between 1850 and 1930 the population increased from 23,000,000 to 123,000,000, and meanwhile per capita production and income rose from about $250 to $700, allowance being made for changes in the level of prices.

Jobs Gain 88 Per Cent

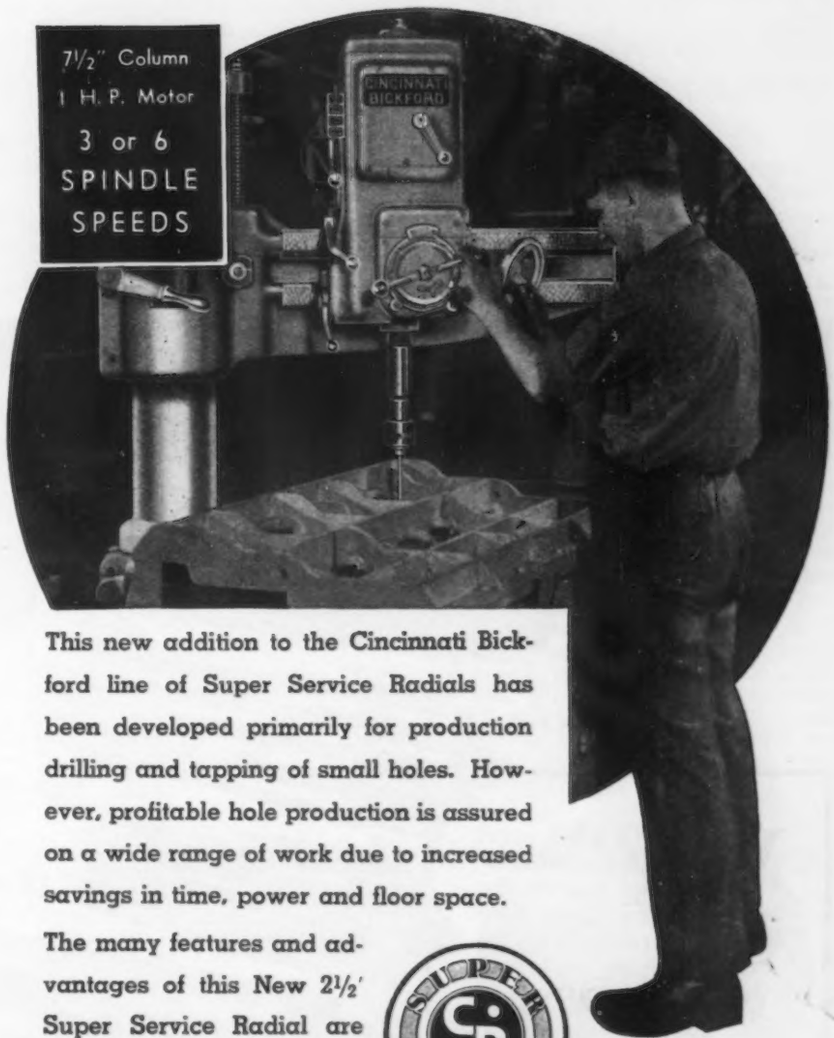
For manufacturing industry as a whole, in the 30-year period from 1899 to 1929, the amount of physical property increased 314 per cent, productivity per man-hour increased 142 per cent. Real wages adjusted 107 per cent, and total wages 216 per cent. The total volume of employment meanwhile increased by 88 per cent. It was the development of machinery in its manifold forms that made possible the great increase in productive efficiency, resulting in a higher standard of living.

Many believe that we are at the end of the road and that further technological development should be halted. Productive capacity in 1929, as high as it was, was not fully utilized and has actually since declined. Hence, instead of reducing productive capacity, it will first be necessary, Dr. Moulton said, to make good the deterioration of plant and equipment sustained during the depression; second, to increase productive capital in proportion to the growth of population, and third, to expand the output of consumption goods in accordance with this growth.

Others believe that with the drying up of frontiers, the lack of new industries and the declining growth in population, there is no room for expansion. The speaker pointed out, however, that labor and capital equipment have always been directed to a double purpose, production of goods

More Profit from New

2½' SUPER SERVICE RADIAL



This new addition to the Cincinnati Bickford line of Super Service Radials has been developed primarily for production drilling and tapping of small holes. However, profitable hole production is assured on a wide range of work due to increased savings in time, power and floor space.

The many features and advantages of this New 2½' Super Service Radial are described in Bulletin R-26. Write for it today.

SUPER SERVICE C B

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

to care for the primary needs of increasing numbers of people and the production of increasing quantities of goods for the existing population.

Is it not obvious, Dr. Moulton asked, that a cessation of population growth does not render it necessary for us to refrain henceforth from producing yet more for the existing population. Are not the unfilled wants and unsatisfied desire of the present 130,000,000 people just as real a source of potential demand as the elemental needs of those who might be born in the years ahead? Studies made by the Brookings Institute indicate that there need be no concern on this score until the national income is at least two or three times its present level.

Buying Power Must Rise

To achieve this goal, we must so operate the system that the real purchasing power of the masses will continuously expand in proportion to the expansion of producing power resulting from technological progress.

The task of raising the standard of living of wage earners necessarily involves increasing the spread between wage rates and prices—a condition that depends fundamentally upon increasing the efficiency of production. To do this there must be constantly increasing production on the part of both labor and capital. As efficiency is increased, the benefits must be broadly disseminated among the masses by means of high wages, low prices or a combination thereof if we are to have social and political stability and a well rounded growth of democracy, Dr. Moulton said.

Toastmaster was L. Clayton Hill, factory manager of the Murray Corp. of America, who earlier in the evening had introduced Walter F. Wagner, president of the ASTE, and John Younger, of Ohio State University, chairman of the fact finding committee of the society.

In the preliminary report presented by Professor Younger, correlating evidence was presented in line with Dr. Moulton's theme. He began by citing some examples of what typical mass-production items would have to sell for today were they made on the equipment available when the original models were brought out. Figures of the steel industry were quoted to show that the introduction of the continuous mill had resulted in the price of sheets being reduced from $102 a ton in 1923 to $59 a ton in 1935. Quoting from

HAROLD G. MOULTON
President, The Brookings Institute

McKAY HARDENED ALLOY TOOLED STEEL ROLLS

McKAY MACHINE CO

WHEREVER steel sheets are processed and leveled, the McKay Alloy Tool Steel Rolls are recognized for their long life and outstanding performance.

The McKay Machine Company is the largest manufacturer of Alloy Tool Steel Rolls for roller levelers and sheet processing equipment in the world.

THE McKAY MACHINE CO
ENGINEERS AND MANUFACTURERS OF SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

L. CLAYTON HILL
Works manager, Murray Corp. of America

figures published in THE IRON AGE, Professor Younger called attention to the fact that the automotive industry employed 15 per cent more men in 1937 than in 1929, although production was 600,000 units less.

Machine Not to Blame

Professor Younger also indicated that in the census of 1930, of 3.63 million people reporting they were unemployed, less than one-third of 1 per cent gave the cause of their unemployment as "machinery introduced." Furthermore, the blame for the continuance of the depression could hardly be laid at the door of the machine tool builders, many of whom were practically shut down in the depths of the slump. You cannot displace men by machines that were never built, concluded the speaker.

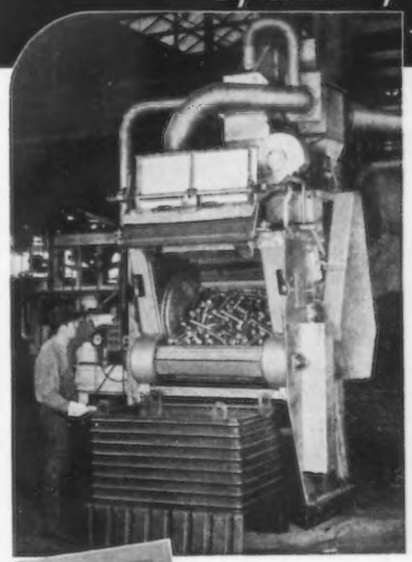
President William F. Green, of the AFL, was quoted as of Jan. 4, 1939, to the effect, "Labor has always believed that the increased production due to technical progress and new industries created by the interplay of such changes can result in greatly increased work opportunities. The Federation does not oppose the introduction of new machine tools nor new processes, but it holds that before changes are made, plans should be made for workers who will be displaced and forced to find new jobs." The fact finding committee found itself in agreement with the principle.

The dinner was attended by over 300 leading industrialists, educators and members of the clergy. Among the guests was Wendell E. Whipp, president of the National Machine Tool Builders Association. K. T. Keller, president of the Chrysler Corp., and Alvan Macauley, president of Packard Motor Car Co., were present representing the honorary sponsoring committee. The show was formally opened the following morning and will continue through Saturday of this week.

U.K. Steel Output Above 60% Throughout 1938

WASHINGTON—Production of iron and steel castings in the United Kingdom in 1938 totaled 10,394,000 tons, or approximately 70 per cent of the rated capacity of 14,500,000 tons, according to reports received by the Department of Commerce. Output was the highest on record except for 1936 and 1937. Steel output stayed above 60 per cent throughout the year.

AIRLESS WHEELABRATING
SAVES $4655.00 A YEAR—
by Reducing Metal Cleaning Costs 54%
★ FOR PROMINENT TOOL MANUFACTURER



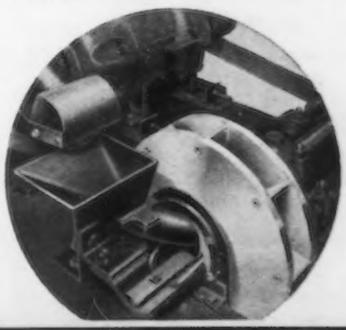
A Nielsen Engineering survey, giving a complete cost analysis and case history of this Wheelabrator installation, will be mailed to you upon request.

Since the development of airless Wheelabrating five years ago, more than 650 plants producing forgings, heat-treated work, castings, etc., have turned to the Wheelabrator method of metal finishing and cleaning. The reason for this is that Wheelabrating not only reduces cleaning costs materially but also produces superior finishes.

For example, a prominent tool manufacturer (name on request) reports that Wheelabrating cleans their annealed steel forgings perfectly and gives them a better finish. As a result the plant no longer experiences difficulty in getting chromium plating to adhere properly to countersunk lettering on the handles of small tools, a problem that caused frequent rejections when pickling and tumbling equipment were used.

The plant has also been able to increase production from four to seven tons of cleaned forgings per eight-hour day and at the same time has effected a reduction of 50% in operating labor. Cleaning costs are now less than half what they were formerly.

The airless Wheelabrator Abrasive Blasting unit is shown at the right. Centrifugal force, generated by the rapidly rotating bladed wheel, hurls abrasive upon the work, under perfect directional control. As a result, the work is scrubbed uniformly clean; and by using the proper abrasive any type of finish can be obtained. Inspection is greatly simplified, too, because Wheelabrating opens up surface defects. Write for details today —ask for Catalog No. 212.



THE American FOUNDRY EQUIPMENT CO.
510 S. BYRKIT ST. MISHAWAKA, IND.

. . . THE NEWS IN BRIEF . . .

39th Acetylene convention reviews welding, cutting in oil industry, elects H. P. Dolisie.—**Page 45.**

Tennessee Coal, Iron & Railroad Co. installs machinery for second blooming mill at Fairfield plant. —**Page 48.**

Dominion Steel aided by British and German trade.—**Page 48.**

Auto production continues gains, reaching 84,095 units. February reports indicate much hand-to-mouth buying. Chevrolet Buffalo branch expansion planned.—**Page 50.**

Gray Iron Founders' Society will hold its annual meeting, May 15, at Cincinnati.—**Page 52.**

Industry may get chance to answer FTC's monopoly attack on steel industry as first round of inquiry ends in fog of theories.—**Page 54.**

Government steel awards for latest reported week total $297,968.—**Page 57.**

Army and Navy ask for bids on machine tools.—**Page 57.**

CIO members offer to work one day a week without pay to help rehabilitate Northwestern Steel & Wire Co. plant damaged by fire.—**Page 58.**

Measures before Congress would make borrowing easier for small businessmen.—**Page 58.**

Administration comes to industry bearing gifts, seeks "appeasement" to halt political tide.—**Page 58.**

State wage-hour bills more drastic than Federal law.—**Page 60.**

Woodward Iron Co. bondholders elect five directors to company's board. —**Page 61.**

Willys-Overland factory sales in February are approximately double sales in like month of 1938.—**Page 61.**

National Steel Corp. has reached "the most satisfactory position attained since its formation" in 1929, E. T. Weir says.—**Page 61.**

Orders gain. Edward R. Stettinius, Jr., tells United States Steel Corp. stockholders.—**Page 62.**

Westinghouse subsidiary buys Iron City Electric Co.—**Page 64.**

Germany's farm tool exports off 11 per cent since 1929, while U. S. exports decline 47 per cent in same period.—**Page 64.**

Birmingham chosen for spring meeting (March 27-28) of Association of Iron & Steel Engineers.—**Page 64.**

Pittsburgh hardware maker doubles working force to help reduce relief rolls.—**Page 64.**

Allegheny Regional Board loading estimate coming.—**Page 65.**

Average weekly earnings in 25 manufacturing industries total $25.95 in January against $26.02 in December.—**Page 65.**

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Warehouse Prices	99
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MEETINGS

March 27 and 28—Association of Iron and Steel Engineers, Birmingham.

April 17 and 18—American Zinc Institute and the Galvanizers Committee, St. Louis.

April 26 to 29—Electrochemical Society, Columbus, Ohio.

May 15 to 18—American Foundrymen's Association, Cincinnati.

May 16 to 17—American Steel Warehouse Association, Chicago.

May 22 to June 8—Society of Automotive Engineers, world congress, in various cities.

May 24 and 25—National Metal Trades Association, Chicago.

May 25—American Iron and Steel Institute, New York.

May 25 to June 1—Triple Convention (American Supply and Machinery Association, the National Supply and Machinery Distributers' Association and the Southern Supply and Machinery Distributers' Association), on board the S.S. Monarch of Bermuda.

Oct. 23 to 27—National Metal Congress, Chicago.

One thousand miles of elevated highways are planned by various cities in the U. S.—**Page 65.**

SWOC loses election at Wellsburg, W. Va., plant, finds its Superior Sheet Metal Works petition dismissed.—**Page 65.**

Westinghouse Electric & Mfg. Co. to furnish drive equipment for Youngstown Sheet & Tube Co.'s new 54-in. mill.—**Page 65.**

Sutton Engineering Co., Bellefonte, Pa., will manufacture recently patented descaling equipment.—**Page 72.**

Drastic price reductions, low operating rate contributed to Jones & Laughlin Steel Corp.'s 1938 loss, H. E. Lewis reports.—**Page 72.**

Technological advances have "enormously increased" employment in the U. S., Dr. H. G. Moulton tells American Society of Tool Engineers.—**Page 73.**

Production of iron and steel castings in United Kingdom in 1938 reported at average of 70 per cent. —**Page 75.**

January iron and steel imports gained over December.—**Page 78.**

Investor's rights winning support, S-T leaders find.—**Page 80.**

Kiekhaefer Corp. takes over Cedarburg Mfg. Co.—**Page 80.**

Domestic orders for machine tools upset seasonal trend, continue advance in February.—**Page 81.**

Ford attorneys request reopening of NLRB case following Supreme Court's decision outlawing sit-downs.—**Page 81.**

Fight against minimum steel wage order by Labor Board expected to be carried to U. S. Appellate Court.—**Page 81.**

Recognition of investor's rights gaining, Youngston Sheet & Tube Co. officials report.—**Page 84.**

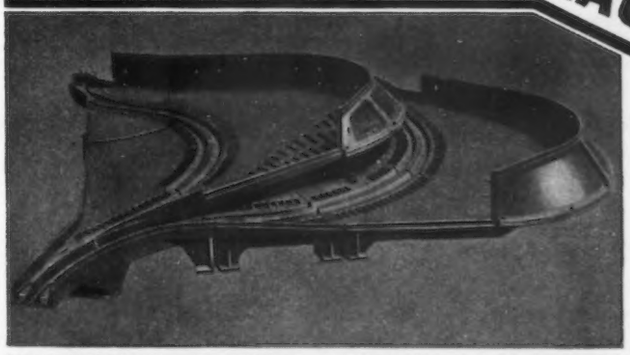
CIO "jury" removes Homer Martin as UAW president, plans "charges" against his followers.—**Page 84.**

Way cleared for National Steel Corp. to build plant in Chicago area.—**Page 84.**

$132,000,000 backlog at Bethlehem Steel's Fore River shipbuilding plant assures 6700 men five years' work.—**Page 84.**

February shipments of U. S. Steel Corp. subsidiaries decline 111,311 tons in February to 677,994 tons. —**Page 102.**

CUT OUT THE LAGS IN YOUR LOOPING



Morgan Repeaters cut down exposure time between passes, preventing serious drops in temperature. They reduce handling risks, insure steady production at speeds far in excess of 1600 f.p.m. They are built in all types: from simple 180° repeaters to compound take-up and over-feed forms for use in four-strand rod mills. And they are repeating squares, ovals, and other sections.

Smooth mechanical handling of rod in looping is only one of Morgan's many contributions to continuous, profitable rolling. Let Morgan engineers give you a detailed report on your repeating and other rolling mill problems.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS

R-54

Let MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *Remove the Lags*

January Iron and Steel Imports Register Gain

IMPORTS of iron and steel products (scrap excepted) into the United States during January totaled 24,331 gross tons valued at $1,729,145—increasing 2083 tons and $323,441 over the trade of December, 1938, according to figures released by the metals and minerals division of the Bureau of Foreign and Domestic Commerce. A year ago—in January, 1938—imports had totaled 29,409 tons valued at $1,680,955.

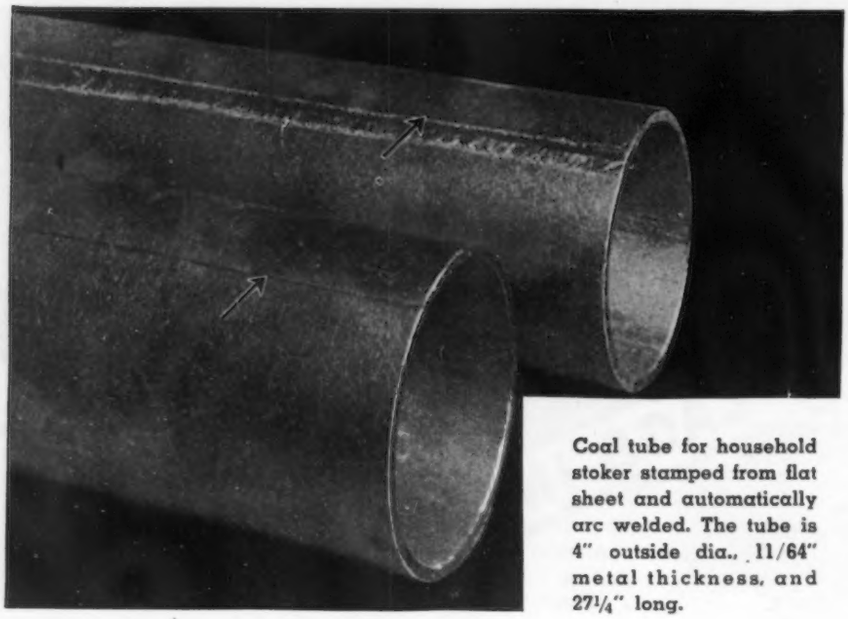
Germany was the principal source of supply for these products during January—her total of 8829 tons being featured by the inclusion of 6393 tons of non-welded steel pipe. Second place went to Belgium, with a total of 7252 tons including 2923 tons of structural shapes, 1601 tons of hoops, and 1584 tons of bars. Sweden's total of 1792 tons, including 967 tons of wire rods, was the third highest for any country during that month.

In point of tonnage the leading commodity imported was "other" steel pipe—i.e. steel pipe other than welded

Exports of Iron and Steel from the United States

(In Gross Tons)

	January 1939	January 1938
Pig iron	6,325	35,997
Ferromanganese and spiegeleisen	....	2
Other ferroalloys	103	189
Scrap, iron and steel	225,434	355,781
Scrap, tin plate	1,639	610
Waste-waste tin plate	811	146
Pig iron, ferroalloys and scrap	*234,312*	*392,725*
Ingots, blooms, billets, sheet bars	13,366	37,551
Ingots, etc., alloy steel, incl. stainless	981	88
Skelp	742	621
Wire rods	353	2,488
Semi-finished steel	*15,442*	*40,748*
Bars, plain and reinforcing	10,682	18,363
Bars, alloy steel	1,352	545
Bars, stainless steel	11	9
Iron bars	61	349
Plates, plain and fabricated	11,016	27,155
Plates, alloy steel	38	288
Plates, stainless	3	10
Sheets, galvanized steel	7,326	3,938
Sheets, galvanized iron	429	176
Sheets, black, plain steel	24,268	16,570
Sheets, alloy steel	347	871
Sheets, stainless	52	79
Sheets, black iron	576	649
Hoops, bands, strips, plain steel	7,057	5,844
Hoops, bands, strip steel, alloy	12	15
Hoops, bands, strip steel, stainless	156	104
Tin plate and taggers' tin	12,670	19,073
Terne plate (including long ternes)	158	1,080
Structural shapes, plain material	5,404	9,738
Structural material, fabricated	1,459	4,919
Sheet piling	167	843
Tanks, steel	1,442	5,083
Steel rails	3,179	13,174
Rail fastenings, switches, spikes, etc.	1,005	1,423
Boiler tubes	393	413
Casing and oil line pipe	4,263	5,944
Pipe, black and galv., welded steel	2,686	1,933
Pipe, black and galv., welded iron	695	425
Plain and galvanized wire	4,140	3,559
Barbed wire and woven wire products	2,729	1,034
Wire rope and other products	858	896
Nails and tacks	1,916	1,094
Bolts, nuts, rivets and washers except track	586	700
Other finished steel	416	989
Rolled and finished steel	*107,552*	*147,285*
Cast iron pipe and fittings	2,774	1,583
Malleable iron screw fittings	309	208
Carwheels and axles	1,385	2,561
Castings, iron and steel	415	580
Castings, alloy steel, incl. stainless	78	29
Forgings, plain	397	516
Forgings, alloy steel, incl. stainless	8	59
Castings and forgings	*5,366*	*5,536*
Total	362,672	586,294



Coal tube for household stoker stamped from flat sheet and automatically arc welded. The tube is 4" outside dia., 11/64" metal thickness, and 27¼" long.

Welded By Carbon Arc Method With Automatic Head

These stamped and carbon arc welded coal tubes show another phase in the wide range of operations performed by Parish. Particular attention is called on this piece of work to the long difficult weld efficiently performed. Parish is prepared to meet your requirements on this and other types of work with the same degree of skill and precision.

Perhaps a study of your product by Parish Engineers will show how you can reduce the cost of parts in many ways. Their job is to help solve your problems, why not write today?

PARISH PRESSED STEEL CO.
READING, PA.
PACIFIC COAST REPRESENTATIVE, F. Samers Peterson Co., 57 California St., San Francisco, Cal.

Imports

(In Gross Tons)

	January 1939	January 1938
Pig iron	586	9,747
Sponge iron	34	11
Ferromanganese[1]	3,150	647
Spiegeleisen	976	125
Ferrochrome[2]	....	20
Ferrosilicon[3]	74	56
Other ferroalloys[4]	25	1
Scrap	3,333	222
Pig iron, ferroalloys and scrap	*8,178*	*10,829*
Steel ingots, blooms, etc.	1	....
Billets, whether solid or hollow	7	233
Wire rods	1,196	504
Semi-finished steel	*1,204*	*737*
Concrete reinforcement bars	365	45
Hollow steel bars	100	125
Merchant steel bars	2,188	1,854
Iron slabs	....	....
Iron bars	50	10
Boiler and other plate	....	4
Sheets, skelp, and saw plate	171	421
Die blocks or blanks, etc.	....	3
Tin plate	3	1
Structural shapes	3,534	3,147
Sheet piling	....	....
Rails and track material	241	184
Welded pipe	270	301
Other pipe	6,550	4,760
Cotton ties	2	19
Other hoops and bands	1,894	2,177
Barbed wire	1,012	3,242
Round iron and steel wire	285	73
Telegraph and telephone wire	1	....
Flat wire and steel strips	270	263
Wire rope and strand	240	213
Other wire	240	259
Nails, tacks, and staples	553	536
Bolts, nuts, and rivets	12	12
Horse and mule shoes	45	31
Rolled and finished steel	*18,026*	*17,680*
Malleable iron pipe fittings	....	11
Cast iron pipe and fittings	32	201
Castings and forgings	224	173
Total	27,664	29,631

[1] Manganese, [2] chrome, [3] silicon and [4] alloy content respectively.

January Imports of Iron and Manganese Ores

(In Gross Tons)

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1939	1938	1939	1938
Canada	60	5	13	....
Cuba	35,003	11,000	2,843	4,348
Chile	118,500	140,600	23	....
Spain	....	....	....	....
Norway	14,944	12,882	....	....
Sweden	7,080	....	....	....
French Africa	....	....	....	....
Russia	....	....	3,250	9,261
India	....	....	....	....
Brazil	....	....	....	....
Gold Coast	....	....	1,849	2,244
Other countries	4,124	4,232	1,688	1,601
Total	179,711	168,719	9,666	17,454

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	January 1939	January 1938
United Kingdom	....	....
British India	202	5,491
Germany	....	....
Netherlands	222	4,160
Canada	162	96
France	....	....
Belgium	....	....
Norway	....	....
Sweden	....	....
Russia	....	....
All others	....	....
Total	586	9,747

pipe. Structural shapes—3534 tons—ranked second with Belgium the chief source. Norway, the Netherlands, and Czechoslovakia were the principal sources from which the 3150 tons of ferromanganese came.

Imports of scrap iron and steel in January declined to 3333 tons valued at $30,707 from the December trade of 6519 tons valued at $76,649.

Scrap exports were lower in January, 227,884 tons, as compared with shipments totaling 323,691 tons in December. The principal markets for iron and steel scrap in January were Japan, 153,331 tons; Italy, 26,055 tons; the Netherlands, 23,190 tons; and Germany, 11,635 tons.

Bridgeport Brass Co. reports for 1938 a net loss of $203,597 compared with a net profit for 1937 of $733,181. During the fourth quarter of 1938 the company made net profit of $231,218, including year-end adjustments. Sales for 1938 totaled $13,132,125, compared with $21,047,799 in 1937. The company reported that it paid taxes totaling $340,196 last year.

METAL WORK MEANS MIDNIGHT OIL

Many firms sell metal cleaning products . . . but how many of them are prepared to supply expert metal cleaning service?

Wyandotte Service Representatives are at home in metal finishing plants the country over. They know that metal cleaning problems need time and patience, and they aren't afraid to burn the midnight oil. They will stick with a problem until it is licked.

The increasing use of new metal finishes means that new metal cleaning difficulties come up every day. You will find your Wyandotte Service Representative ready at hand and able to help. Call him today.

THE J·B·FORD COMPANY
WYANDOTTE MICHIGAN
DISTRICT OFFICES IN 26 CITIES

REINFORCING STEEL

. . . Awards of 5150 tons; 5720 tons in new projects.

ATLANTIC STATES
AWARDS

700 **Tons,** Havre de Grace, Md., Susquehanna River bridge, to Bethlehem Steel Co., Bethlehem, Pa., through Robert C. Reitz, Lancaster, Pa., contractor.

300 **Tons,** Fort Jay, N. Y., barracks, to Capitol Steel Corp., New York, through Eureka Fireproofing Co., Brooklyn.

240 **Tons,** Curtis Bay, Md., Coast Guard station, to American Steel Engineering Co., Philadelphia.

190 **Tons,** Oswego, N. Y., power station, to the Truscon Steel Co., Youngstown.

CENTRAL AND WESTERN STATES

2500 **Tons,** Chicago, subway section D5, to Joseph T. Ryerson & Son, Inc., Chicago.

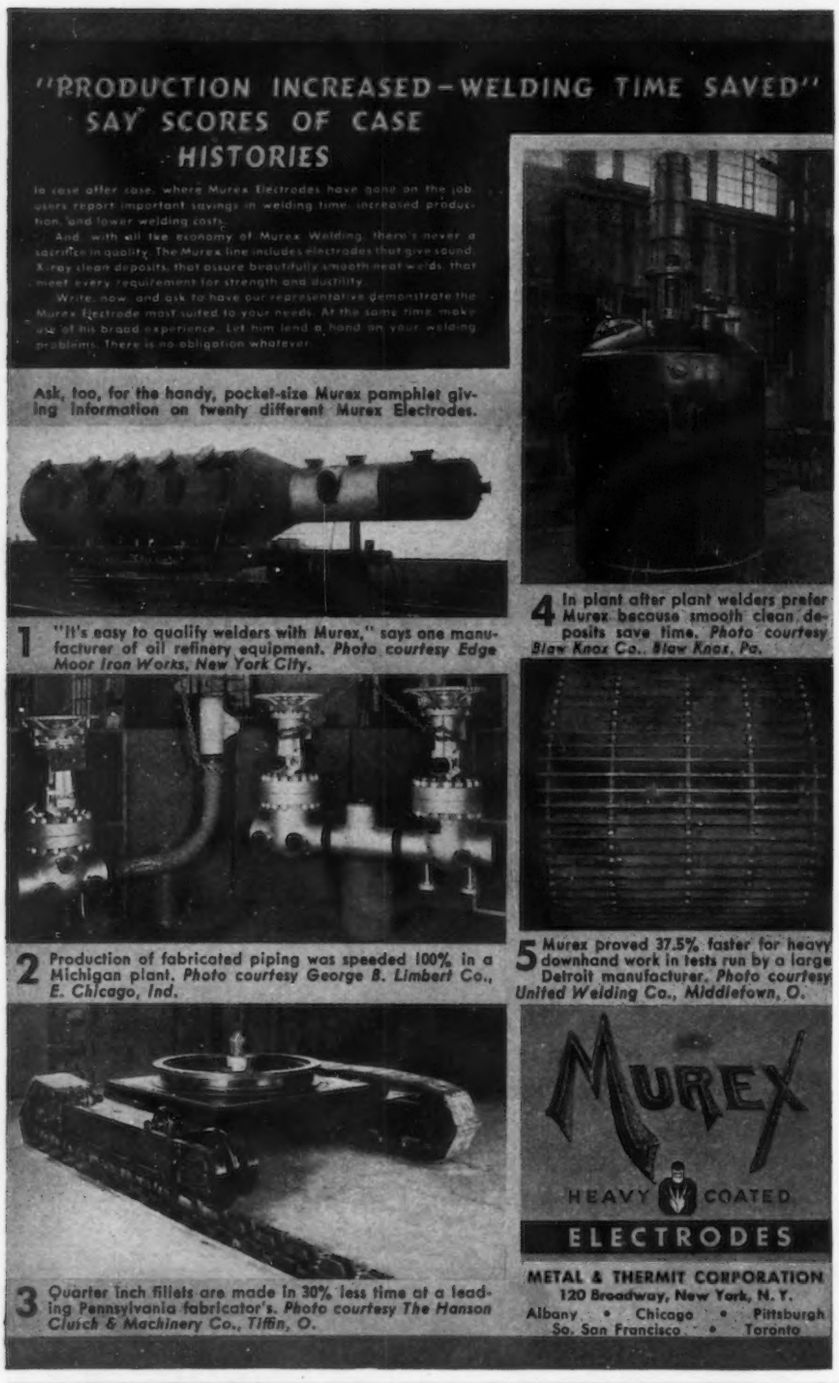
390 **Tons,** Ann Arbor, Mich., girls' dormitory, to Great Lakes Steel Corp., Detroit, through McRae Steel Co., Detroit.

350 **Tons,** Detroit, apartment building, to Great Lakes Steel Corp., Detroit, through Concrete Steel Fireproofing Co.

200 **Tons,** Cleveland, Carter Road bridge, to Republic Structural Iron Works, Cleveland, through Lombardo Brothers Construction Co., Cleveland.

140 **Tons,** Orange, Cal., city lists, to Truscon Steel Co., Los Angeles.

105 **Tons,** Berdi, Nev., highway bridge, to Bethlehem Steel Co., San Francisco.


"PRODUCTION INCREASED—WELDING TIME SAVED" SAY SCORES OF CASE HISTORIES
In case after case, where Murex Electrodes have gone on the job users report important savings in welding time, increased production, and lower welding costs.
And with all the economy of Murex Welding, there's never a sacrifice in quality. The Murex line includes electrodes that give sound X-ray clean deposits, that assure beautifully smooth neat welds, that meet every requirement for strength and ductility.
Write, now, and ask to have our representative demonstrate the Murex electrode most suited to your needs. At the same time, make use of his broad experience. Let him lend a hand on your welding problems. There is no obligation whatever.
Ask, too, for the handy, pocket-size Murex pamphlet giving information on twenty different Murex Electrodes.
1 "It's easy to qualify welders with Murex," says one manufacturer of oil refinery equipment. Photo courtesy Edge Moor Iron Works, New York City.
2 Production of fabricated piping was speeded 100% in a Michigan plant. Photo courtesy George B. Limbert Co., E. Chicago, Ind.
3 Quarter inch fillets are made in 30% less time at a leading Pennsylvania fabricator's. Photo courtesy The Hanson Clutch & Machinery Co., Tiffin, O.
4 In plant after plant welders prefer Murex because smooth clean deposits save time. Photo courtesy Blaw Knox Co., Blaw Knox, Pa.
5 Murex proved 37.5% faster for heavy downhand work in tests run by a large Detroit manufacturer. Photo courtesy United Welding Co., Middletown, O.
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HEAVY COATED
ELECTRODES
METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
Albany • Chicago • Pittsburgh
So. San Francisco • Toronto

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1200 **Tons,** Bob's Creek, Md., substructure, Potomac River bridge, Merritt-Chapman & Scott Corp., New York, low bidder.

250 **Tons,** New York, East River Drive bulkhead wall.

200 **Tons,** Brookline, Mass., Newhall Village.

200 **Tons,** Newark, N. Y., school; bids close March 22.

160 **Tons,** Hoboken, N. J., Department of Agriculture building; previous bids rejected, new bids out (previously reported).

160 **Tons,** Westchester County, N. Y., Fleetwood viaduct, contract 417; closing postponed until March 21.

150 **Tons,** Cambridge, Mass., high and Latin school addition; Rugo Construction Co., contractor.

100 **Tons,** Springfield, Mass., sewer, sections C-D-E; Deliso Construction Co., Jamaica, N. Y., contractor.

CENTRAL AND WESTERN STATES

1445 **Tons,** Huntington, W. Va., flood wall for United States Engineers (516-39-240); bids March 15.

700 **Tons,** Jefferson City, Mo., Missouri Highway Commission; bids due March 20.

385 **Tons,** Greenville, Miss., substructure of bridge across Mississippi River, F. V. Ragsdale Construction Co., Memphis, Tenn., low bidder on general contract.

280 **Tons,** Lorain, Ohio, bridge substructure, East 21 Street and Colorado Avenue; bids due March 30.

250 **Tons,** Cincinnati, grain elevator.

225 **Tons,** E. Lansing, Mich., auditorium.

194 **Tons,** Pomona, Cal., 2 overcrossings; bids March 30.

130 **Tons,** St. Louis, Waring School; I. E. Millstone Construction Co., St. Louis, low bidder on general contract.

Investor's Rights Winning Support, S-T Leaders Find

YOUNGSTOWN — Recognition is increasing that capital has the right and necessity to earn a fair return, an appreciation vital to the return of confidence, stockholders of Youngstown Sheet & Tube Co. are told in the 39th annual pamphlet report, signed by H. G. Dalton, chairman, and Frank Purnell, president.

"There now is greater stability in prices and there are indications that the volume of the company's business in the first half of 1939 will exceed that for the same period of 1938," the executives said.

Sheet & Tube's net sales volume during 1938 was $84,664,566, against $144,288,797 during 1937. Ingot operations averaged 38 per cent in 1938, against 64.4 during 1937.

Kiekhaefer Corp. Takes Over Cedarburg Mfg. Co.

CHICAGO—Cedarburg Mfg. Co., Cedarburg, Wis., has been absorbed by the Kiekhaefer Corp. which will continue the manufacturing activities of the Cedarburg company, and will also develop new products.

Fight Over Steel Wage On Way to U. S. Appeals Court

WASHINGTON — Counsel for seven independent iron and steel producers in the East were to file an application with the United States Court of Appeals for the District of Columbia early this week, asking that the Secretary of Labor be restrained from continuing the 62½c. minimum wage rate which became effective on March 1 under the Walsh-Healey Public Contracts Act.

This action was taken after Justice Jennings Bailey in the Federal District Court terminated a temporary restraining order which had granted three of the companies the right to bid on Navy contracts without adhering to the prescribed minimum wage rate.

Lukens Steel Co., of Coatesville; Alan Wood Steel Co., of Conshohocken, and Central Iron & Steel Co., of Harrisburg, Pa., were covered by the temporary restraining order. Other companies joining in the original action and in the appeal were the South Chester Tube Co., of Chester; the Harrisburg (Pa.) Steel Corp.; the Eastern Rolling Mill Co., Colgate, Md., and the Atlantic Wire Co., Branford, Conn.

Leigh Block Elected Vice-President of Inland

LEIGH BLOCK, son of LEOPOLD E. BLOCK, chairman, Inland Steel Co., has been elected a vice-president of the company in charge of purchases, succeeding his uncle, Emanuel J. Block, who died March 5. Leigh Block started with Inland in the Indiana Harbor works of the company and 10 years later had risen to the post of assistant vice-president and assistant manager of sales in the flat rolled division.

Ford Asks Reopening of Its Labor Board Case

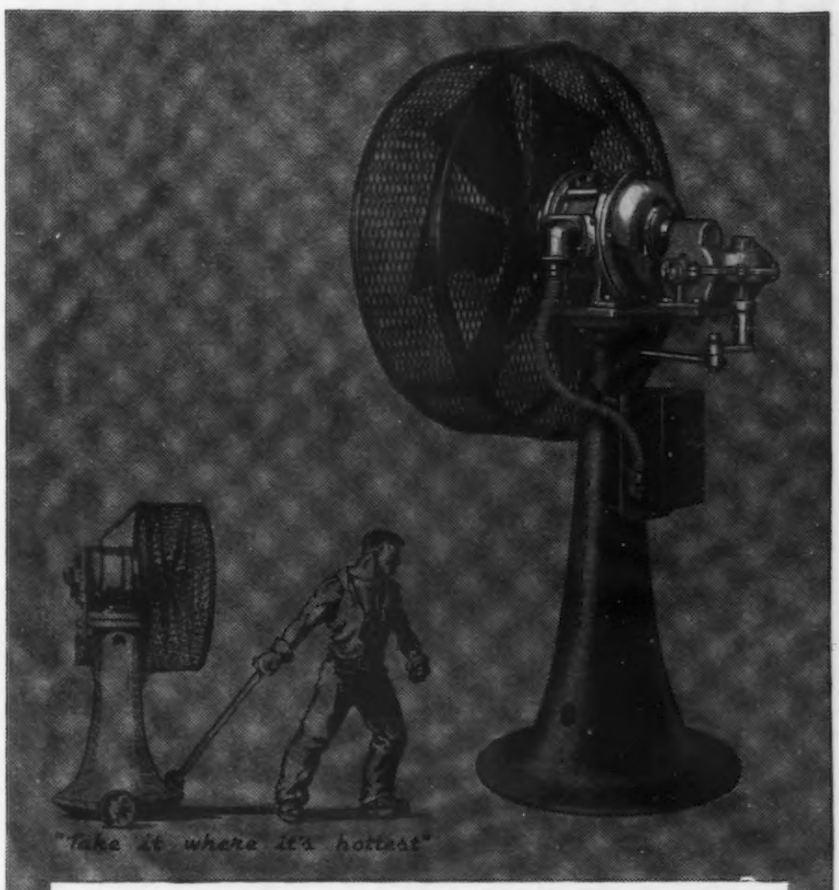
WASHINGTON — Counsel for the Ford Motor Co. asked the National Labor Relations Board on Monday to reopen the case involving the company's Dearborn (Mich.) plant to allow introduction of new evidence in the light of the recent Supreme Court decision outlawing the sit-down strike.

Domestic Orders for Machine Tools Climb

CLEVELAND—Domestic orders for machine tools continued to gain during February over foreign business, according to the National Machine Tool Builders' Association, whose latest monthly report shows the index of total orders up to 167.1 for February, compared to 150.8 in January, a gain of 16.3 points. The three-month average of the Association is up to 154.8, against only 136.5 at the last report.

February is normally considered seasonably low, the Association pointed out, but the strength of current demand upset tradition last month. In February, 1938, the index stood at 75.7. Starting last August, the monthly reports have shown uninterrupted gains. Since late last year, domestic business has been increasingly stronger.

Foreign business during February held at around the same level that prevailed during January.



Perkins Man Coolers create refreshing recirculation of air without chilling drafts.
Perkins Man Coolers help to maintain production schedules in the hottest places.
Perkins Man Coolers decrease labor turnover and help to make contented workers.
Perkins Man Coolers are made in Oscillating and Stationary types, both portable.

B. F. PERKINS & SON, INC. **Holyoke, Mass.**
Engineers and Manufacturers

PERKINS MAN COOLERS
TRADE MARK REG. U. S. PAT. OFF.

. GREAT BRITAIN .

. . . February best month for British steel industry since March, 1938

LONDON, March 14 (*By Cable*)—The improvement in the British iron and steel market is still maintained. February steel output at 971,000 tons is the highest since last March, and the current month is likely to be higher as more blast and steel furnaces have been started. On the Northeast Coast alone over 2000 more men were taken on during the past two or three weeks.

General commercial demand is improving, though export is still unsatisfactory, but South Africa is taking good quantities.

Cleveland foundry iron is still the least active section with export idle. The Northeast Coast in February imported 1000 tons of Continental semi-finished steel under the quota agreement.

The Continental steel market is still quiet. The seasonal period is approaching, but there is little to suggest that demand may revive. Consumers abstention in part is attributed to price irregularities, concessions being more general.

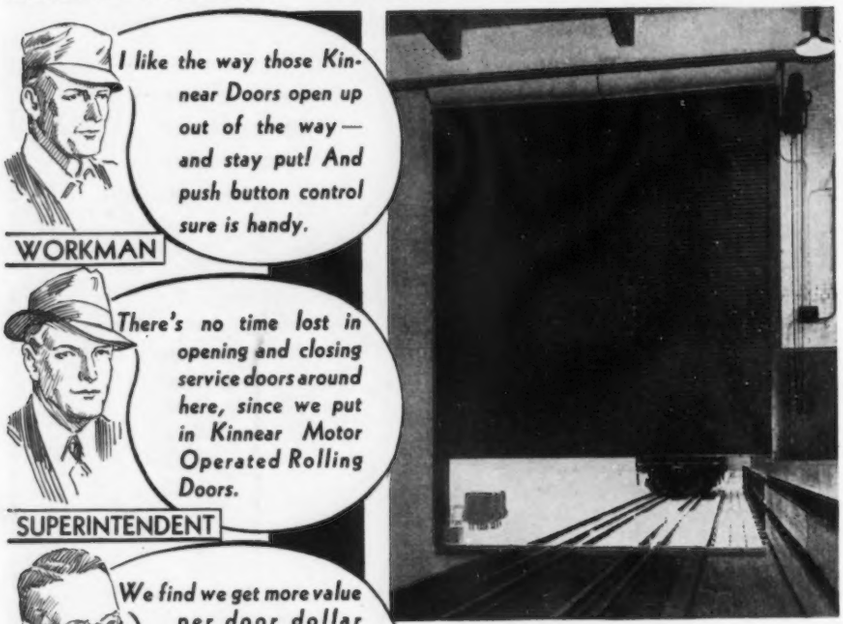
At the Cartel meeting the Czechoslovakian quota was discussed and believed to have been agree upon. All prices were left unchanged.

Dutch imports of American steel plates last year amounted to 50,000 metric tons.

The British tin plate market is active, chiefly with Empire markets, South America and the Continent. Home trade is bought up to the end of the year. Large size wasters are scarce and prices are advancing. Welsh output is around 55 per cent.

Galvanizers are busy on air raid shelters and home and commercial demand is broadening. The Argentine Government is expected to shortly place orders for 14,000 tons of sheets for fighting locusts.

KINNEAR ROLLING DOORS



I like the way those Kinnear Doors open up out of the way—and stay put! And push button control sure is handy.

WORKMAN

There's no time lost in opening and closing service doors around here, since we put in Kinnear Motor Operated Rolling Doors.

SUPERINTENDENT

We find we get more value per door dollar with "Kinnears" because they save space, work faster and smoother, and last longer.

PURCHASING AGENT

Door operating and maintenance costs became an insignificant item after we installed Kinnear Rolling Doors.

MANAGER

No wonder Kinnear Rolling Doors get all around approval! They operate with *maximum* efficiency in the *minimum* amount of space—opening upward on a vertical plane, easily and smoothly, and coiling compactly above the opening. They provide the durability of all-steel, plus its protection against fire, weather, intrusion and damage. They save space, time and effort, and cut installation, operation and maintenance costs. Kinnear Rolling Doors are made to fit any opening, can be equipped for motor, mechanical, or manual operation, and can be installed economically in any building, old or new.

Let us send you the new catalog of valuable information on door problems and how they can be solved the Kinnear way. Write today!

The KINNEAR Manufacturing Company
1760-80 FIELDS AVENUE - COLUMBUS, OHIO
Factories: Columbus, Ohio, and San Francisco, California

. . . PIPE LINES . . .

Standard Oil Co. of Ohio, Midland Building, Cleveland, plans new 10-in. welded steel pipe line through east Toledo district, Toledo, Ohio, to connect with oil refinery on Maumee Bay shore, for gasoline transmission. Company also has plans for 6-in. welded steel pipe line at Cincinnati, about 14 miles long, for gasoline transmission in conjunction with new bulk plant in city, on which work is scheduled to begin in April. Cost of latter project estimated at $500,000 with terminal plant noted.

Hornell Gas Light Co., Hornell, N. Y., plans new pipe line from city limits to Arkport, about eight miles, for gas transmission to latter place, where service will be furnished. J. B. Bradley is president.

Aloco Oil Co., Midland, Tex., has approved plans for immediate construction of 6-in. welded steel pipe line from Denver oil field area, Yoakum County, Tex., to connection with main trunk line of Atlantic Refining Co., at Hobbs, N. M., about 31 miles, for crude oil transmission. Booster pumping station will be installed to provide line capacity of about 10,000 bbl. per day. Company also plans drilling operations in oil district noted, where leases on about 16,000 acres have been secured from Texas Co.

Citizens Utilities Corp., La Junta, Colo., plans pipe line extensions and replacements in gas distribution system in different parts of city, work to begin in spring.

Safford (Graham County), Ariz., plans pipe lines for natural gas distribution system, including control station and other operating facilities. A. A. Weiland, Pueblo, Colo., consulting engineer, will make surveys and estimates of cost.

Corpus-La Rosa Pipe Line Co., Corpus Christi, Tex., recently organized by officials of Terminal Refining Co., same place, plans new 6-in. welded steel pipe line from La Rosa oil field district, Refugio County, Tex., to point on ship channel at Corpus Christi, about 27 miles, for crude oil transmission to new bulk

terminal at latter point, primarily for export service, with part of output to be used by Terminal company at local refinery. Company also will build 4-in. welded steel pipe line from Refugio oil field area to La Rosa field, about 10 miles, for crude oil transmission, connecting at last noted district with new line to Corpus Christi referred to. Project will include booster pumping stations, gathering system and other operating facilities. Company has contracted with Coronado Exploration Co., with wells in fields noted, for oil supply.

Department of Interior, Bureau of Indian Affairs, Eighth and Figueroa Building, Los Angeles, plans several 4-in. steel pipe lines, each about 525 ft. long, 7/16-in. thick at lower end tapering to ¼-in. at upper end, in connection with new three-unit pumping station at St. Ignatius, Mont., to be used for elevating water about 335 ft. Bids are scheduled to be asked soon. This is part of Flathead Indian irrigation project.

CAST IRON PIPE

Newport, R. I., is asking bids until March 18 on 630 tons of 4 to 20-in. pipe for its water main contract No. 2.

Shawnee Township, near Kansas City, Kan., care of Howard Antrim, 719 Osage Street, Kansas City, Kan., engineer, plans pipe line extensions in water system to Morris district. Cost about $410,000. Financing in part is being arranged through FRC. Thomas F. McGlynn, Brotherhood Building, Kansas City, Kan., is attorney for township.

Mathis, Tex., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower, pumping machinery and accessories. Cost about $65,000. Bond issue has been authorized.

Maple Plain, Minn., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about $37,000. Druar & Milinowski, Globe Building, St. Paul, Minn., are consulting engineers.

Board of Public Works, San Diego, Cal., Fred A. Rhodes, director, plans pipe line extensions and replacements in water system, including new 30-in. trunk main from Upas and Ray Streets to Upas Street and Fifth Avenue, about 10,000 ft., estimated cost $138,650; 24-in. trunk main in Upas Street, from Fifth Avenue to Albatross Street, cost about $19,150; several 16-in. main lines in different streets, totaling about $78,000. Special election has been called April 25 to approve bonds for $250,000.

Bremerton, Wash., plans pipe line extensions in water system in Shorewood Drive district. Estimates of cost are being made. Proposed to arrange bond issue for financing. C. C. Casad is city engineer.

Kincaid, Kan., plans water pipe line extensions and other waterworks installation. Cost about $45,000. Financing is being arranged. S. J. Rever, 219 South Central Street, Parsons, Kan., is consulting engineer.

Metropolitan Utilities District, Omaha, Neb., plans about three miles of pipe line extensions in water system in recently created district. T. A. Leisen is chief engineer and general manager.

Board of Commissioners of Public Works, Spartanburg, S. C., asks bids until March 29 for 900 ft. of 30-in. pipe for new raw water line; also for pumping machinery for new station with rated capacity of 5,000,000-gal. per day; 3,000,000-gal. filtration plant, other pipe lines and accessory equipment. R. B. Sims is superintendent.

San Luis Obispo, Cal., plans water pipe line extensions and replacements. Bond issue is being arranged to vote fund of $50,000 for this and other waterworks installation.

United States Treasury Procurement, San Francisco, has awarded 113 tons of 20-in. pipe to United States Pipe & Foundry Co., San Francisco.

. . . CANADA . . .

. . . *Improvement in demand for steel expected next month.*

TORONTO, March 14—The Algoma Steel Corp. will share in the rail award by the New York Central Railroad.

Demand for iron and steel and their products continues steady with improvement predicted for next month. Recent rolling stock contracts placed by the Canadian National Railways will have a stimulating effect on plant operations in the immediate future.

Pig iron sales remain practically unchanged, although volume is standing well up to the peak for the year. Producers have opened books for second quarter but booking is slow on this account and melters appear in no hurry to cover under the impression that prices will remain unchanged for some time. Production continues unchanged.

EXTRA *Ingredients* *enable*

PERM-A-CLOR

to solve your

"Impossible"

Cleaning Problems!

THIS degreasing solvent was created specifically for those exacting applications where greater stability is a necessary quality. It is the most highly stabilized chlorinated solvent on the market!

This extra stability makes Perm-A-Clor particularly suited to the cleaning of aluminum parts, die castings, and combinations of metals which cause rapid break-down of ordinary solvents.

Perm-A-Clor is non-explosive and non-inflammable. Its price is slightly higher but this is more than offset by its greater factor of safety for adverse operating conditions. It has a longer useable life and higher margin of safety.

If you have a degreasing job which is giving you trouble, Perm-A-Clor and the free services of a Detrex Engineer will solve your problem. The coupon will bring complete information.

DETROIT REX PRODUCTS CO.

Engineered Solvent Degreasing and Alkali Cleaning

13010 HILLVIEW AVENUE **DETROIT, MICHIGAN**

Branch Offices in Principal Cities

SEND COUPON FOR COMPLETE INFORMATION

If you have a metal cleaning problem of any kind, the years of experience and facilities of this organization are at your disposal without obligation. Write us about it. The coupon will bring complete information about Perm-A-Clor and Triad Solvents.

DETROIT REX PRODUCTS CO.

Please send complete information and prices covering Perm-A-Clor and Triad Degreasing Solvents.

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Way Cleared for National Steel To Build Chicago District Plant

By ROBERT G. BINGHAM
Iron Age Chicago Editor

o o o

CHICAGO—National Steel Corp., through its subsidiary, Midwest Steel Corp., is expected to begin construction of a steel plant on the southern shore of Lake Michigan, near Valparaiso, Ind., late this year or early in 1940.

Impetus behind National's plan to go ahead with this long-rumored project was given by the Indiana State Legislature, which appropriated $50,000 for development of a harbor at Burns Ditch, contingent upon definite assurance from National that the mill would be built.

Representatives of the Valparaiso Chamber of Commerce are in Washington now seeking Federal maintenance for the harbor when completed and in use. Much of the past delay is said to have been caused by uncertainty as to whether the State would construct the harbor and the Federal Government maintain it.

It is believed the Chicago district mill will provide National with additional sheet, tin plate and bar capacity, as the wide variety of consuming industries in this district provides a market for these products.

The elimination of basing point differentials has made it difficult for National to ship into the Chicago area because of the high freight absorption necessary to compete with local producers. The company's nearest sheet and bar capacity is the Great Lakes Steel Corp., Detroit, while tin plate is available only from Weirton and Clarksburg, W. Va., and Steubenville, Ohio.

It is probable that only finishing facilities will be located here at the outset and that the billets will be shipped by water from Detroit.

H. L. Gray, former Chicago sales manager of Weirton Steel Co., another subsidiary, has been named an assistant vice president in charge of western sales and is working directly on this project.

Unless topographical surveys of the district around Burns Ditch are available from the state of Indiana, National is expected to begin this preliminary work immediately.

Weirton's Chicago office is seeking additional office space at 228 North LaSalle Street, its present address.

CIO "Jury" Ousts Martin; Warns His Followers

CLEVELAND.—After removing Homer Martin as president at a "trial" here and revoking his union membership, the CIO-recognized executive board of the United Automobile Workers Union instructed all its lodges to prefer charges against any members attending the convention of Martin's independent union in Detroit, March 4. A national convention of the UAW-CIO will open here March 27. Several days before the meeting here Martin was elected president of the independent group now opposed to the CIO wing. The latter group claims to represent 335,000 of the original 370,000 union members.

31 To Begin Jail Terms In Fansteel Strike Cases

CHICAGO — Thirty-one persons, 21 of whom were sentenced early in 1937, this week will begin serving jail terms imposed for contempt of court during the strikes at the North Chicago, Ill., plants of Fansteel Metallurgical Corp., and Chicago Hardware Foundry Co.

The sentences, ranging from 10 to 240 days, were pronounced after CIO strikers openly disobeyed court orders to refrain from molesting loyal employees of the companies and from creating disorderly situations. Appeals were made and some of the men have fought the sentences from that time until the recent Supreme Court decision against sitdown strikes.

Thirty-nine strikers and sympathizers were sentenced for their actions during the Fansteel strike, 18 of whom already have served their terms. The remaining 21, led by Meyer Adelman, CIO organizer, promised to surrender last week. In the second strike, at the Chicago Hardware Foundry Co., last summer 10 persons were held in contempt, four surrendering last week and the other six were expected to give up later in the week.

Last minute leniency was asked for the men by attorneys who pointed out the existence of harmonious relations today, but Judge Ralph J. Dady, of the circuit court at Waukegan, Ill., who imposed the original sentences, refused to alter his previous decisions.

Quincy Yards Expand; 6700 Sure of Jobs to '44

BOSTON—With the Government's award of two cruisers to cost $26,000,000 to Bethlehem Steel Co., the Fore River Works now has a $132,000,000 backlog, sufficient to keep its 6700 employees busy during the next five years. The Quincy plant payroll of about $9,000,000 yearly is heaviest since World War days.

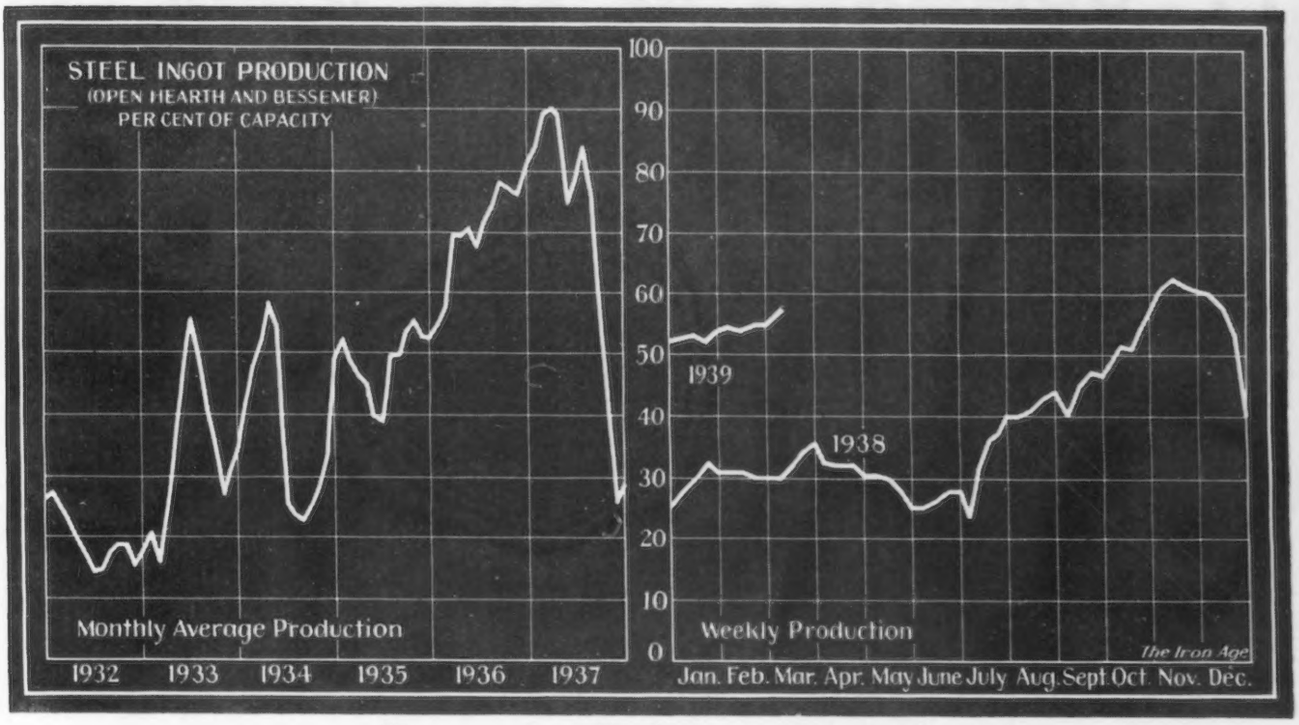
In view of contract work it has been necessary for the Quincy plant to extend its operating facilities. The expansion plan calls for an expenditure of some $646,000 immediately. Other plans for expansion are in the making. Already Clark & Smith, Inc., 1372 Hancock Street, Quincy, Mass. has been awarded a contract to enlarge the boiler making plant at Quincy; the Dwan Construction Co., 29 Bay Street, Dorchester, Mass., will increase the mold loft 8 per cent giving 863,000 sq. ft. of space, the Austin Co., Boston, has been given a contract to enlarge office and drafting space at a cost of $160,000, for a new dock devoted exclusively to handling turrets for battleships; and better than $200,000 will be expanded on new machine tool equipment, most of which already has been contracted for.

Weirton's New Shape Mills Ready by July 1

THE Weirton Steel Co., Weirton, W. Va., announces that by July 1 its new facilities for the production of larger shapes than it has previously been able to roll will be completed.

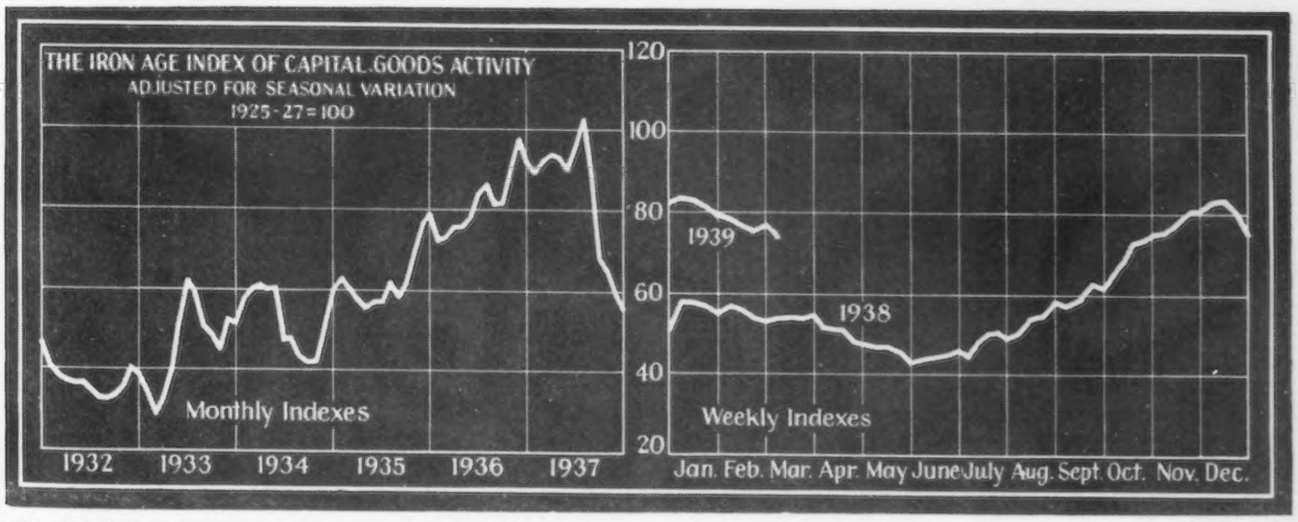
Expanding its present limits of production, which are from 1 x 1 in. to 8 x 8 in. angles and standard channels and beams not exceeding 12 in., the company will then be able to produce wide flange beams in widths up to and including 8¼ in. and depths of sections up to and including 21 in.; standard channels from 3 in. to 18 in.; I-beams from 3 in. to 24 in.; car and ship channels from 3 in. to 13 in. and sheet piling in standard and special sizes.

Ingot Output Up One Point to 56 Per Cent



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	51.0	56.0	53.0	39.0	55.0	32.0	70.0	72.0	72.0	55.4	60.0	66.5	75.0	**56.0**
PREVIOUS WEEK..	49.0	58.0	49.0	39.0	54.0	32.0	70.0	72.0	72.0	49.5	60.0	63.0	60.0	**55.0**

Gain of Two Weeks Ago Wiped Out, Index Drops Back to 75.1



DESPITE a 7 per cent increase in automobile assemblies and continued expansion of operations in the Pittsburgh district, THE IRON AGE index of capital goods activity lost 1.3 points in the week ended March 11, completely wiping out the gain recorded in the week of March 4, which was the first advance of the index in six weeks. The index received its chief setback from the heavy construction and lumber carloadings series. The losses of these two components, being counter to seasonal trends, were unsually heavy. The steel production factor lost 0.4 point in the week after adjusting an unchanged physical output against a rising seasonal trend.

	Week Ended Mar. 11	Week Ended Mar. 4	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	72.3	73.7*	37.7	118.9
Automobile production[2]	83.8	81.1	54.3	131.6
Construction contracts[3]	101.8	105.3	71.4	133.5
Forest products carloadings[4]	44.8	49.2	50.7	122.4
Production and shipments, Pittsburgh Districts[5]	72.9	72.7	51.3	116.4
Combined index	**75.1**	**76.4***	**53.1**	**124.6**

*Revised.

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot output up slightly; new business gains slowly.

° ° °

. . . New quantity deduction setup less favorable to buyers.

° ° °

. . . Conditions, though spotty, seem favorable for improvement.

WHATEVER gains are being made in sales of steel products are not in keeping with the expectations for seasonal improvement in March, which frequently has been the peak month of steel production. While progress is slow, hopes have strengthened that recovery in steel volume will extend well through the second quarter at least.

Ingot production for the industry as a whole has risen one point this week to 56 per cent of capacity, but the improvement is partly the result of larger specifications against contracts placed during the past few months and not wholly a reflection of current business.

Moreover, the trend is not altogether in one direction: The Chicago district, which has been gaining consistently for several weeks, lost two points to 56 per cent, and reports from there indicate a slight decline in new business. Offsetting this loss, the only one of importance, are gains in the Pittsburgh, Youngstown, Cleveland-Lorain and Southern Ohio districts. The Pittsburgh district picked up as much as the Chicago district lost.

THE reaffirmation of present prices on major steel products, including tin plate, though clearing the atmosphere, has not yet contributed to much improvement in tonnage. However, there is likely to be a spurt over the remainder of the month in orders for those products on which quantity deductions are less favorable than they have been.

Clarification of the new setup announced last week reveals that 75 tons of flat rolled products in one size and one grade for shipment at one time must be ordered to entitle the buyer to the $3 a ton deduction, whereas heretofore 25 tons of one size and one grade could be included in an order of 150 tons which took the $3 deduction. Similar reclassification of quantity deductions has been made on hot rolled and cold finished bars. As there are comparatively few consumers whose character of manufacture permits the ordering of 75 tons of one size and grade at one time, the change in the quantity deductions should produce a moderate increase for the mills in the realized net prices obtained for sheets, strip and bars.

Following the reaffirmation of prices on major steel products, there has been an extension through the second quarter of current prices on rivets and cap screws, and it is expected that bolt and nut prices will also be continued. Nearly all pig iron producers have announced unchanged quotations.

THE steel industry finds varying conditions among its principal consuming outlets. The automobile industry, though increasing its assembly schedules, is not making new purchases beyond fill-in lots as it is still receiving shipments of flat rolled products contracted for last fall. There has been a moderate gain this week in the placing of fabricated structural steel contracts, which total nearly 23,000 tons, but there has been a lull in the letting of tonnage for PWA projects that were authorized before the end of 1938. Official information from Washington is that the peak steel requirements for the PWA program will not be reached until June or July. The farm machinery industry, though still active on tractors, has stocked dealers with spring farm equipment and is curtailing manufacturing somewhat.

Railroads are still counted on to provide additional tonnage to the steel mills. Car builders expect that not less than 8000 freight cars will be bought before the end of the second quarter, including inquiries now pending from the Missouri Pacific, Illinois Central, Chicago & North Western and Denver & Rio Grande Western. The Great Northern is expected to buy also. The allocation of 56,200 tons of rails by the New York Central gave tonnage to three mills in the United States and one in Canada. Several thousand tons of accessories also were ordered.

Among the fabricated structural steel contracts placed during the week were two that indicate a return to the market of some of the public utilities. The Central New York Power Corp. placed 3000 tons for a steam plant at Oswego, N. Y., and the Pacific Gas & Electric Co. ordered 1150 tons for steam plants at Avon and Martinez, Cal. Among new structural projects is 9300 tons for the substructure of a Potomac River bridge at Bob's Creek, Md. Fifteen Mississippi River barges on which bids are being taken will require 5800 tons of plates.

SCRAP markets display strength, but prices are unchanged, THE IRON AGE scrap composite remaining at $15.17. A delegation from the International Scrap Convention, the European scrap buying agency, is in this country and may buy 150,000 tons or more of scrap before departing a few weeks hence.

How Finished Steel Was Di

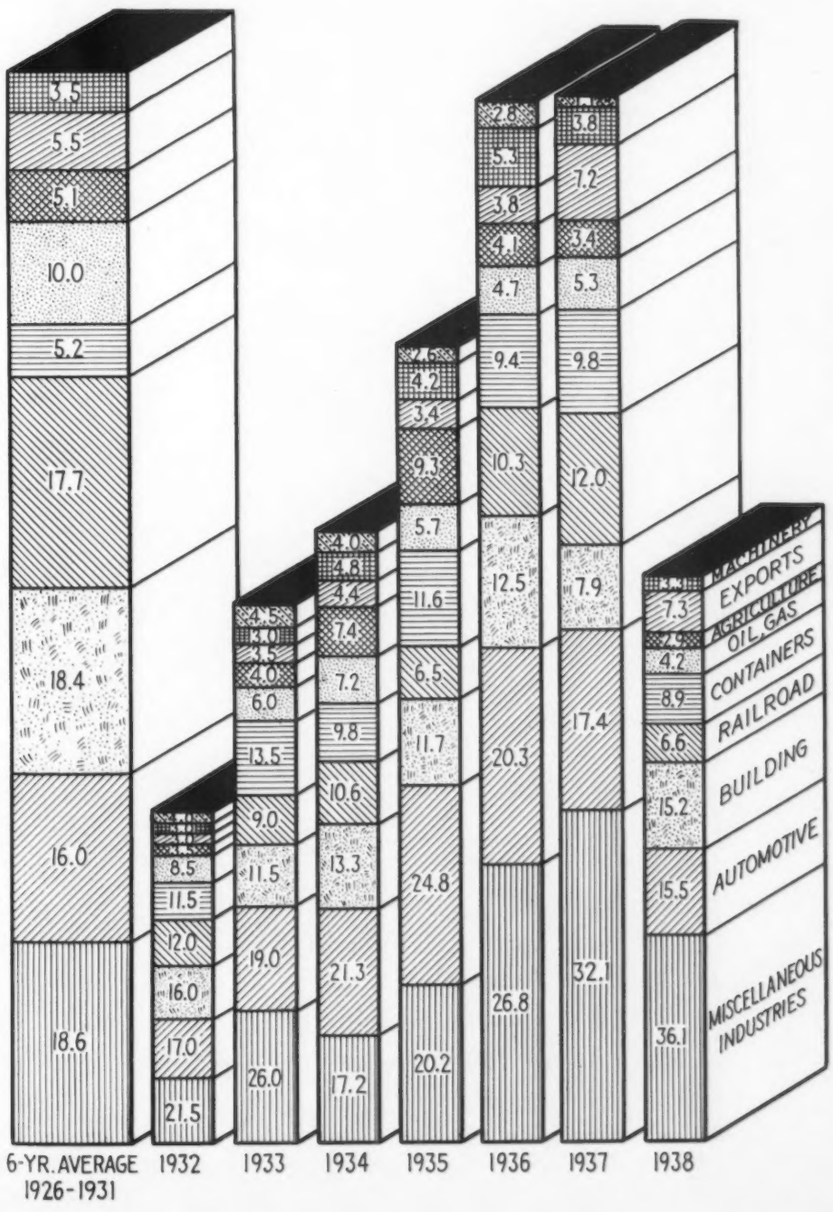
FOR the seventh consecutive year the automobile industry in 1938 led all other steel consuming channels as the steel industry's best customer. The construction industry came second, while the railroads, which at one time were the largest users of steel products, made relatively a poor showing.

Reports on which the accompanying figures are based came from integrated steel companies having a total of 95 per cent of the industry's ingot capacity. To simplify the record, the reports of non-integrated steel companies have not been used, but their proportion of the total steel business is indicated with reasonable accuracy by the fact that the integrated companies reporting shipped during the year for further conversion 488,267 gross tons of blooms, billets and slabs, 385,090 tons of sheet and tin bars and 318,951 tons of skelp. Most of the blooms, billets and slabs would have been marketed as bars, while the sheet and tin bars are used for sheets and tin plate and the skelp almost wholly for pipe. Wire rods are included in the tabulation; those which were used for further conversion appear in the item of wire products sold to wire manufacturers.

The total of the finished steel shipments reported to THE IRON AGE for the year is 17,653,500 gross tons. Adding to this a total of 1,192,3 blooms, billets, slabs, sheets, skelp sold for further c gives 18,845,808 tons. The port of the American Iron Institute on finished and sem steel produced for sale in 19 a total of 20,993,315 tons.

This year's figures are pr a slightly different manner vious years. After conferri number of the leading steel c

AGAIN the automobile industry led in 1938 as chief consumer of steel, but buildings and construction followed close behind. The tonnage taken by jobbers included in miscellaneaus industries was a significant item. Containers in third place, railroads lag.



DISTRIBUTION OF ROLLED STEEL IN 1938 ACCOR

INDUSTRY
1. Steel converting and processing industries:
(a) Wire manufacturers
(b) Bolt, nut, rivet and screw manufacturers
(c) Forging manufacturers
2. Jobbers, dealers and distributers (not including concrete bar fabricators)
3. Construction industries:
(a) Contractors, fabricators, etc.
(b) Concrete reinforcing bar fabricators
(c) Building material and equipment manufacturers
4. Shipbuilders
5. Pressing and forming industries:
(a) Stamped and pressed steel products manufacturers
(b) Household equipment, including furniture, heating equipment, refrigerators, etc.
6. Container industry
7. Agriculture, including implement and equipment manufacturers
8. Machinery and tool industry:
(a) Electrical machinery and equipment manufacturers
(b) All other machinery and tools
9. Automotive industry
10. Railroads, including car and locomotive builders and parts manufacturers
11. Oil, gas and water and public utilities
12. Mining and lumbering industries
13. Miscellaneous industries
14. Exports
Total

DISTRIBUTION OF

	1938 M. Tons	1938 Per Cent
Buildings and construction	2,688.8	15.2
Railroads	1,172.3	6.6
Automotive	2,739.9	15.5
Oil, gas, water, mining, etc.	738.4	4.2
Containers	1,568.0	8.9
Agriculture	509.7	2.9
Shipbuilding	296.3	1.7
Machinery and tools, including elec.	577.6	3.3
Exports	1,297.9	7.3
Highways	*	....
All other consuming channels	6,064.6	34.4
Total	17,653.5	

* Included in Buildings and Construction.

PRO

	1938 M. Tons	1938 Per Cent
Rails	603.2	3.4
Plates	1,537.3	8.7
Tin plate and black plate	1,489.0	8.4
Other sheets	3,739.8	21.2
Strip	1,334.1	7.6
Wire products	1,776.1	10.1
Shapes	1,486.3	8.4
Bars, merchant	2,216.2	12.6
Bars, concrete	615.5	3.5
Pipe and tubing	1,653.7	9.4
Track accessories	237.5	1.3
All other finished products	964.8	5.4
Total	17,653.5	

eel Was Distributed by Consuming Channels in

ing to this a total of 1,192,308 tons of blooms, billets, slabs, sheets, bars and skelp sold for further conversion, gives 18,845,808 tons. The annual report of the American Iron and Steel Institute on finished and semi-finished steel produced for sale in 1938 showed a total of 20,993,315 tons.

This year's figures are presented in a slightly different manner from previous years. After conferring with a number of the leading steel companies, THE IRON AGE decided that a statistical balance would be better attained by including the following three items in the classifications of Buildings and Construction: Buildings and bridges for railroads, heretofore carried in the railroad classification; highways and highway bridges, and the steel shipped to concrete bar fabricators, practically all of which goes into building construction. A regrouping of the various classifications has also been carried out, but without essential changes in the resulting figures.

No estimating has been done by THE IRON AGE in any of the figures presented; they are actually as received from the steel companies, no calculations having been made for the 5 per cent of ingot capacity not reporting.

Total finished steel shipments to the automobile industry were 2,739,900 gross tons, or 15.5 per cent of the total for all users. Some of the semi-fin-

ROLLED STEEL IN 1938 ACCORDING TO SHIPMENTS OF COMPANIES HAVING 95 PER CENT OF THE TOTAL INGOT PR

Amount of Each Form (In Thousands of Gross Tons) Consumed by Various Industries

INDUSTRY	Rails	Track Accessories	Shapes	Plates	Bars	Concrete Bars	Tin Plate and Black Plate	Galvanized Sheets	All Other Sheets	Strip Steel	Pipe and Tubing
processing industries:											
urers	....	....	....	....	1.4	....	....	....	0.5	0.6	1.3
and screw manufacturers	....	....	0.8	....	89.5	0.3	0.1	....	....	2.7	0.3
acturers	....	....	0.7	1.3	51.2	....	....	....	0.8	0.8	0.6
distributers (not including concrete	6.4	15.9	134.7	92.2	207.6	....	25.0	509.5	267.3	53.9	566.8
es:											
bricators, etc.	4.9	0.3	956.9	345.8	86.6	231.6	....	95.7	92.3	19.2	45.6
rcing bar fabricators	....	....	5.6	0.2	6.9	284.4	....	7.4	1.9	1.0	....
ial and equipment manufacturers	0.1	....	15.4	10.4	25.5	0.8	3.0	74.4	68.0	24.0	4.2
	0.1	0.1	41.5	197.8	18.4	0.3	0.1	1.7	3.6	0.4	10.7
industries:											
ressed steel products manufacturers	....	....	0.3	7.1	26.4	11.4	17.0	31.3	54.9	45.6	0.8
pment, including furniture, heating											
rigerators, etc.	....	....	4.2	3.1	34.1	....	19.0	30.2	276.8	87.5	4.0
	....	....	0.6	66.9	3.8	....	1,166.0	13.6	213.1	58.8	0.1
implement and equipment manu-	....	....	26.1	25.9	199.1	....	....	37.7	29.5	44.9	3.0
ndustry:											
inery and equipment manufacturers		0.1	23.7	23.2	20.8	....	0.5	2.7	70.7	23.7	30.8
nery and tools	0.7	0.1	46.3	72.8	113.8	0.5	0.8	3.6	30.7	17.3	24.1
	....	....	10.4	61.8	686.6	0.4	2.5	4.5	1,099.0	652.7	10.9
ar and locomotive builders and parts	526.4	198.2	63.9	155.3	65.9	0.6	....	9.2	33.8	12.5	9.7
d public utilities	5.8	1.8	28.9	79.6	13.7	4.2	8.1	1.2	35.2	3.3	484.6
g industries	12.5	5.0	6.3	7.2	7.1	1.3	0.1	2.3	3.3	1.0	3.0
ies	13.2	9.2	41.4	208.0	451.3	35.3	46.5	58.0	321.2	228.8	368.4
	33.1	6.8	78.6	178.7	106.5	44.4	200.3	83.7	170.5	55.4	84.8
	603.2	237.5	1,486.3	1,537.3	2,216.2	615.5	1,489.0	966.7	2,773.1	1,334.1	1,653.7

DISTRIBUTION OF FINISHED STEEL BY CONSUMING CHANNELS (THOUSANDS OF GROSS TONS)

	1938		1937		1936		1935		1934		1933		193
	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons
n	2,688.8	15.2	2,570.0	7.9	4,000	12.5	2,865	11.7	2,500	13.3	1,900	11.5	1,650
	1,172.3	6.6	3,891.6	12.0	3,300	10.3	1,605	6.5	2,000	10.6	1,500	9.0	1,250
	2,739.9	15.5	5,651.9	17.4	6,500	20.3	6,075	24.8	4,000	21.3	3,150	19.0	1,750
tc.	738.4	4.2	1,713.5	5.3	1,500	4.7	1,400	5.7	1,350	7.2	1,000	6.0	900
	1,568.0	8.9	3,180.0	9.8	3,000	9.4	2,840	11.6	1,850	9.8	2,250	13.5	1,200
	509.7	2.9	1,119.6	3.4	1,300	4.1	2,270	9.3	1,382	7.4	650	4.0	350
	296.3	1.7	300.2	0.9	300	0.9	215	0.9	300	1.6	175	1.0	100
uding elec.	577.6	3.3	1,223.6	3.8	1,700	5.3	1,040	4.2	900	4.8	500	3.0	300
	1,297.9	7.3	2,356.9	7.2	1,200	3.8	825	3.4	835	4.4	550	3.5	300
	*	....	355.9	1.1	900	2.8	650	2.6	750	4.0	750	4.5	400
nels	6,064.6	34.4	10,168.6	31.2	8,300	25.9	4,720	19.3	2,940	15.6	4,175	25.0	2,100
	17,653.5		32,531.8		32,000		24,505		18,807		16,600		10,300

Construction.

PRODUCTION OF FINISHED STEEL (THOUSANDS OF GROSS TONS)

	1938		1937		1936		1935		1934		1933		193
	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons	Per Cent	M. Tons
	603.2	3.4	1,374.4	4.2	1,170	3.7	700	2.9	1,010	5.4	416	2.5	403
	1,537.3	8.7	3,127.4	9.6	2,500	7.8	1,700	6.9	1,438	7.6	1,160	7.0	830
	1,489.0	8.4	2,673.1	8.2	2,400	7.5	2,100	8.6	1,735	9.1	1,964	11.8	1,000
	3,739.8	21.2	7,160.3	22.0	7,000	21.9	5,200	21.2	3,193	17.0	3,084	18.6	1,613
	1,334.1	7.6	2,995.6	9.2	3,120	9.7	3,400	13.9	2,273	12.1	1,929	11.6	1,265
	1,776.1	10.1	2,456.7	7.6	2,850	8.9	2,400	9.8	1,723	9.2	2,024	12.2	1,186
	1,486.3	8.4	2,680.0	8.2	2,450	7.7	1,600	6.5	1,425	7.6	1,109	6.7	937
	2,216.2	12.6	4,396.5	13.5	4,300	13.4	4,075	16.6	2,711	14.4	2,245	13.5	1,285
	615.5	3.5	771.3	2.4	900	2.8	500	2.0	487	2.6	369	2.2	385
	1,653.7	9.4	3,093.4	9.5	3,050	9.5	2,000	8.2	1,896	10.1	1,548	9.3	946
	237.5	1.3	612.0	1.9	600	1.9	325	1.3	350	1.9	200	1.2	147
s	964.8	5.4	1,191.1	3.7	1,660	5.2	505	2.1	566	3.0	557	3.4	355
	17,653.5		32,531.8		32,000		24,505		18,807		16,605		10,352

in 1938

Compiled by THE IRON AGE

anges

THE pre- eived cula- 5 per ng. o the 9,900 total i-fin-

ished steel sold to non-integrated mills for further conversion undoubtedly found its way into the automobile industry, but no calculations of this tonnage have been attempted. Undoubtedly the same percentages would roughly apply in the final distribution of this semi-finished material in its finished form.

Buildings and construction took 2,688,800 tons, or 15.2 per cent, coming very close to the automobile industry. Railroads, with buildings and bridges omitted, took 1,172,300 tons, or 6.6 per cent. Containers were in third place, taking 8.9 per cent of all finished steel. A surprising figure is the total amount of steel sold through jobbers, amounting to 2,513,900 tons, not including concrete bars and other products handled by concrete bar fabricators and now included in the building construction classification. If the tonnage handled by concrete bar fabricators were included with all other steel handled through jobbers or distributers, the resultant total would exceed that taken by the automobile industry. In the accompanying chart the jobber tonnage is placed in the classification of miscellaneous industries. Exports were an important item. Though the tonnage was less than in 1937, the percentage figures were approximately the same—7.3 per cent in 1938 against 7.2 per cent in 1937.

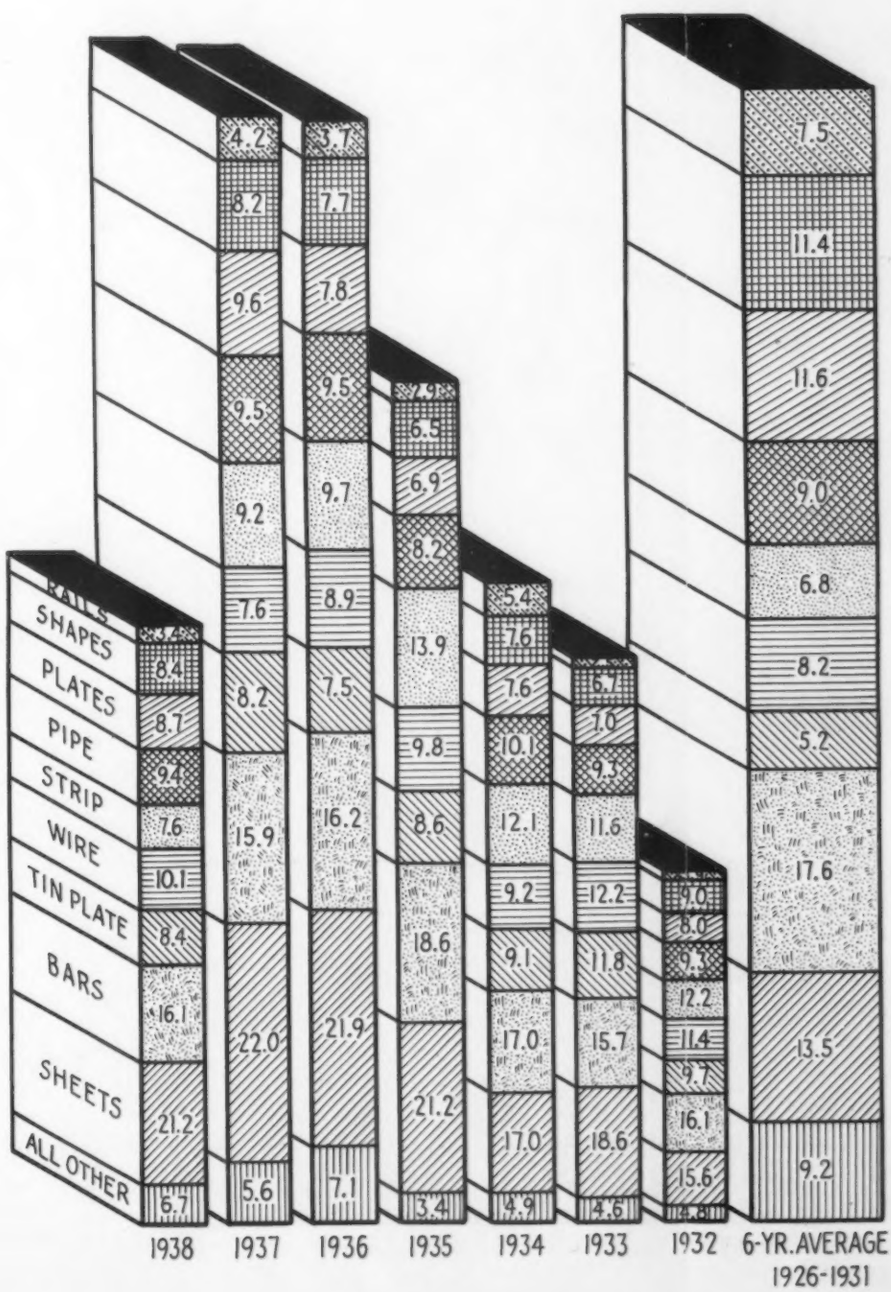
GOT PRODUCING CAPACITY

Pipe and Tubing	Wire Products	All Other Finished Steel	Totals
1.3	158.4	....	162.2
0.3	58.2	1.8	153.7
0.6	0.3	0.8	56.5
566.8	517.2	117.4	2,513.9
45.6	101.3	71.8	2,052.0
....	2.1	....	309.5
4.2	69.7	31.8	327.3
10.7	4.2	17.4	296.3
0.8	16.1	3.0	213.9
4.0	72.4	102.6	633.9
0.1	22.7	22.4	1,568.0
3.0	141.1	2.4	509.7
30.8	17.4	30.1	243.7
24.1	12.4	10.8	333.9
10.9	51.9	159.2	2,739.9
9.7	13.0	83.8	1,172.3
484.6	8.3	5.9	680.6
3.0	4.2	4.5	57.8
368.4	378.1	171.1	2,330.5
84.8	127.1	128.0	1,297.9
,653.7	1,776.1	964.8	17,653.5

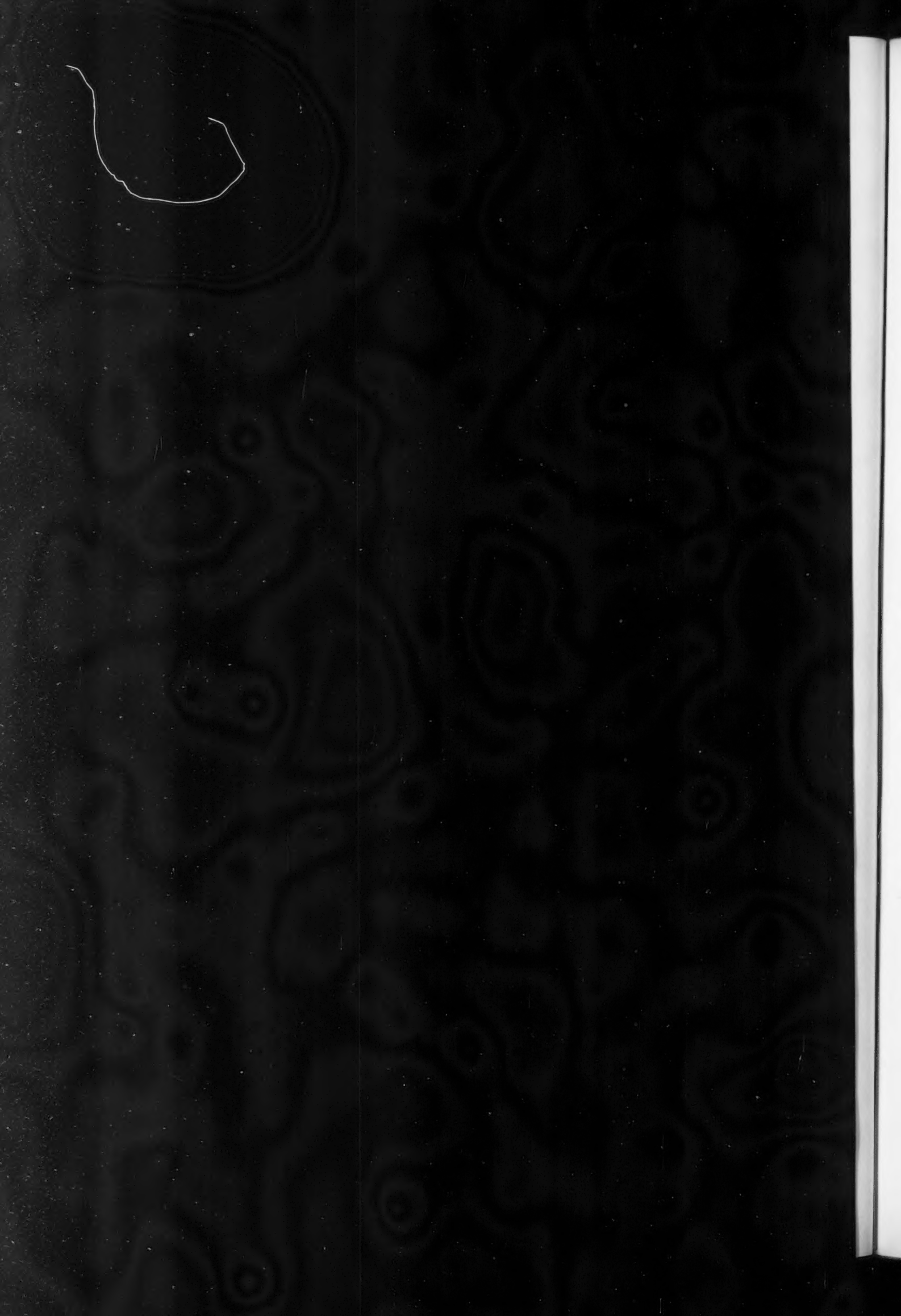
1932		Six-Year Aver. 1926-1931	
M. Tons	Per Cent	M. Tons	Per Cent
1,650	16.0	5,950	18.4
1,250	12.0	5,691	17.7
1,750	17.0	5,175	16.0
900	8.5	3,217	10.0
1,200	11.5	1,692	5.2
350	3.5	1,642	5.1
100	1.0	.....	....
300	3.0	1,117	3.5
300	3.0	1,758	5.5
400	4.0	.....	....
2,100	20.5	5,991	18.6
10,300		32,233	

1932		Six-Year Aver. 1926-1931	
M. Tons	Per Cent	M. Tons	Per Cent
403	3.9	2,404	7.5
830	8.0	3,745	11.6
1,000	9.7	1,672	5.2
1,613	15.6	4,362	13.5
1,265	12.2	2,200	6.8
1,186	11.4	2,650	8.2
937	9.0	3,684	11.4
1,285	12.4	4,842	15.0
385	3.7	837	2.6
946	9.3	2,905	9.0
147	1.4	733	2.3
355	3.4	2,199	6.9
10,352		32,233	

THE lighter steel products—sheets, strip, tin plate and black plate, wire and bars—constituted 63.4 per cent of all finished steel shipments in 1938. Even without bars, the other light products made up 47.3 per cent.



UNIV. OF MICH.



A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Mar. 14, 1939	Mar. 7, 1939	Feb. 14, 1939	Mar. 15, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem; Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24, Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Mar. 14, 1939	Mar. 7, 1939	Feb. 14, 1939	Mar. 15, *1938
Wire nails, Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.30	3.30	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.84
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.34
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	80.00	80.00	80.00	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$16.00	$16.00	$15.75	$13.75
Heavy melting steel, Phila	15.25	15.25	15.25	14.75
Heavy melting steel, Ch'go	14.25	14.25	14.00	12.25
Carwheels, Chicago	13.00	13.00	12.50	14.00
Carwheels, Philadelphia	16.75	16.75	16.75	15.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	15.75
No. 1 cast, Philadelphia	16.75	16.75	16.75	15.75
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.75	11.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.00
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, electrolytic, Conn.	11.25	11.25	11.25	10.00
Copper, lake, New York	11.375	11.375	11.375	10.125
Tin (Straits), New York	46.00	46.00	45.50	41.75
Zinc, East St. Louis	4.50	4.50	4.50	4.25
Zinc, New York	4.89	4.89	4.89	5.60
Lead, St. Louis	**4.70**	4.60	4.70	4.35
Lead, New York	**4.85**	4.75	4.85	4.50
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	15.75

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
March 14, 1939	2.286c. a Lb.	$20.61 a Gross Ton	$15.17 a Gross Ton
One week ago	2.286	20.61	15.17
One month ago	2.286	20.61	15.00
One year ago	2.512	23.25	13.58

Finished Steel — Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1939	.....	.....
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29
1928	2.192c., Dec. 11	2.142c., July 10

Pig Iron — Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1939	.....	.....
1938	$23.25, June 21	$19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.73, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24

Steel Scrap — Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1939	$15.17, Mar. 7	$14.875, Jan. 31
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 10
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 9

. . THIS WEEK'S MARKET NEWS . .

STEEL OPERATIONS

. . . Rate for industry rises to 56% but Chicago is off two points

STEEL ingot operations this week present a varied picture. While the rate for the entire industry is estimated to be up one point to 56 per cent, the CHICAGO district, which has been gaining consistently for a month and a half, dropped two points to 56 per cent, but the PITTSBURGH district gained two points to 51 per cent. YOUNGSTOWN has also made a gain, four points to 53 per cent, and the CLEVELAND-LORAIN average is up one point to 55 per cent. A gain has also been made in SOUTHERN OHIO.

The BIRMINGHAM district presents the steadiest situation in the industry, the rate there having remained constant for several weeks.

PRICES

. . . Details of changes in quantity deductions on flat rolled products and bars

IMPORTANT changes in selling practices of hot and cold rolled sheets and strip and hot rolled bars are embodied in recently revised quantity deduction setups. Under the old practice quantity deductions applied on items of 25 net tons or more of one size of sheets and strip, determined by the total weight of one grade, one analysis and one finish released at one time for shipment to one destination within a period not exceeding 15 days. The total weight of one grade and one analysis and one finish could have been released either in one size or in a combination of sizes, and if in the latter, the weight of each size must have been at least 25 net tons.

Under the practice as revised last week as far as sheets and strip are concerned, no combination of sizes is allowed and shipment must be made to one destination at one time without a leeway of 15 days as heretofore. This means that a customer, in order to obtain the maximum quantity deduction of $3 a ton, say on sheets, must order at least 75 tons of one size, one grade and one analysis at one time to one destination. Heretofore, had he ordered 75 tons, it would have been possible to have the 75 tons comprised of three items of different sizes, provided the amount covering each size was 25 tons or more.

Specific paragraph involving deductions on hot and cold rolled bars continues unchanged since quantity deductions on these items heretofore, and as revised, apply to one size for shipment at one time to one destination. Complete details on the quantity deductions follow:

Old

150 net tons and over, deduction 15c. a 100 lb.
Under 150 tons to 100 tons inclusive, deduction 10c. a 100 lb.
Under 100 tons to 50 tons inclusive, deduction 7½c. a 100 lb.
Under 50 tons to 25 tons inclusive, deduction 5c. a 100 lb.
Under 25 tons to 1 ton (Hot rolled sheets and strip and cold rolled sheets), Base
Under 25 tons to 3 tons (Hot rolled bars and cold rolled strip), Base

New

75 tons and over, deduction 15c. a 100 lb.
Under 75 tons to 50 tons inclusive, deduction 10c. a 100 lb.
Under 50 tons to 20 tons inclusive, deduction 5c. a 100 lb.
Under 20 tons to 1 ton inclusive (Hot rolled sheets and strip and cold rolled sheets), Base
Under 20 tons to 3 tons inclusive (Hot rolled bars and cold rolled strip), Base

The descriptive paragraph governing quantity deductions under the old setup on hot and cold rolled sheets and strip was as follows:

Quantity deductions apply on items of 25 net tons or more of one size (one gage or thickness and one width—on sheets, length is also a part of the size) and are determined by the total weight of one grade, one analysis, and one finish, released at one time for shipment to one destination, within a period not exceeding 15 days. This total weight of one grade, one analysis, and one finish may be released either in one size or in a combination of sizes, but if a combination of sizes is released, the weight of each size must be at least 25 net tons.

The descriptive paragraph governing quantity deductions under the new setup is as follows:

Quantity deductions are determined by the total weight of a size (one gage or thickness and one width—on sheets, length is also part of the size) of one grade, one analysis, and one finish, released for shipment to one destination at one time.

On flat rolled products the recently announced revisions in quantity deductions will apply on second quarter shipments but either the old or the new setup may apply on shipments during the remainder of this quarter, depending on which is the most advantageous to the consumer. The new setup on hot rolled bars became effective March 8.

Changes in quantity deductions and extras have been made in the sale of cold finished bars for second quarter shipment, the major one being that the minimum quantity to take the $3 a ton deduction is 75 tons instead of 150 tons as heretofore. The material must be of one size and grade for shipment at one time to one destination. The quantity extra on lots of less than 300 lb. has been reduced from $3 a 100 lb. to $2.50. The quantity extra on 1000 to 1499 lb. has been increased 10c. to $1 a 100 lb. Details on the quantity deduction setup are as follows:

Old

150 tons and over, deduction 15c. a 100 lb.
Less than 150 tons to 50 tons inclusive, deduction 12½c. a 100 lb.
Less than 50 tons to 30 tons inclusive, 10c. a 100 lb.
Less than 30 tons to 10 tons inclusive, 5c. a 100 lb.
Less than 10 tons to 5 tons inclusive, Base.

New

75 tons and over, deduction 15c. a 100 lb.
Under 75 tons to 50 tons inclusive, 10c. a 100 lb.
Under 50 tons to 10 tons inclusive, 5c. a 100 lb.
Under 10 tons to 5 tons inclusive, Base.

Continuation into second quarter of present base prices on steel has been followed by reaffirmation of pig iron, rivet and cap screw prices.

NEW BUSINESS

. . . Orders decline slightly at Chicago . . . Some moderate gains elsewhere

AGGREGATE business at PITTSBURGH in the past week was substantially unchanged from the level of the previous week. There is further evidence, however, of a continuation in diversification of orders.

Steel buyers' requirements, as reflected at CLEVELAND and YOUNGSTOWN, continue to expand gradually. The heavy industries are supplying most of the impetus, with spring seasonal influences becoming more pronounced. There is likelihood of

increased specifications from the automotive industry.

The volume of miscellaneous orders has declined slightly in CHICAGO but little change is apparent in the optimism with which CHICAGO sellers are regarding the coming of spring. Less demand has been reported from some major consumers, automobile and farm equipment makers primarily. A final buy on 1938 cars is looked for at any time from Detroit, with 1940 steel purchases scheduled to start in late April and May. Farm equipment plants, though still active on tractors, have stocked dealers with implements for spring and are slowing their rate of activity somewhat at present.

SEMI-FINISHED STEEL

. . . Tin bars predominate in current shipments

NON-INTEGRATED mills continue to furnish major support in the semi-finished market with movement of tin plate bars predominating. Other consumers have expanded requirements slightly but orders last week were comparable to recent volume. Buying remains on a strictly hand-to-mouth basis with little or no likelihood of an early change in this policy.

PIG IRON

. . . Very little buying being done for the second quarter

THE opening of books by pig iron producers for second quarter with no change in prices, except in the case of the Mystic furnace at Everett, Mass., has met with no large response from users of iron.

Mystic furnace, having reduced its quotations 75c. a ton to a parity with eastern Pennsylvania furnaces (instead of Buffalo furnaces as incorrectly stated in last week's issue), has booked several thousand tons for second quarter, but in other districts there does not seem to have been much contracting thus far.

The reduction of 75c. a ton in its prices was not a sign of price weakness in New England, according to the management of the Mystic furnace, but was made because of a desire to obtain a larger share of the eastern New England business to which the company believes it is entitled by reason of its location. The 75c. a ton differential over eastern Pennsylvania prices was a relic of the NRA code. It is said that Mystic had been subject to criticism by some New England customers because of the maintenance of this differential, which enabled outside furnaces to obtain a higher delivered price.

Shipments of iron are a little better in some areas, but on the whole there is no marked improvement. PITTSBURGH reports a better situation in new business, releases and shipments, but at CLEVELAND and YOUNGSTOWN there was very little change in the first 10 days of March as compared with the like period in February. However, a better sign for the future is the fact that some of the heavier industries are getting busier owing to Government awards. At CHICAGO shipments of pig iron and foundry coke are about equal to those of the same period last month, while new contract sales are increasing somewhat. Shipments in the ST. LOUIS area are expected to be slightly larger this month than in February. The melt in the stove industry shows a considerable pickup. In the CINCINNATI district shipments are at about the February level. In PHILADELPHIA February was not as good as January, but improvement is expected this month. In NEW YORK consumers are buying very cautiously, new orders being far below the volume of shipments: foundry operations are rather slow.

Market Sidelights

Bureau of Supplies and Accounts, Navy Department, will open bids March 23 for 1308 tons of steel, 971 tons to consist of bar and strip material for the battleship *Alabama*, and 337 tons to consist of black and galvanized shapes for the seaplane tenders *Barnegat* and *Biscayne*. The *Alabama* is being built at the Norfolk, Va., Navy yard, and the seaplane tenders are under construction at the Puget Sound, Wash., Navy yard.

* * *

American Cast Iron Pipe Co., Birmingham, has been awarded 16,000 tons of pipe by Greenville, S. C.

* * *

Falk Corp., Milwaukee, has received a large order from the United States Maritime Commission for reduction gear units for four C-3 type, diesel-powered cargo ships. Some time ago the Falk Corp. received an order for the reduction gear units for four C-2 types of similar vessels. The engines in the C-2 vessels are in process of manufacture at the works of the Nordberg Mfg. Co., Milwaukee.

* * *

Twin Coach Co., Kent, Ohio, is reported to have quotations outstanding now upon more than $5,000,000 of potential business. The company manufactures buses.

* * *

Manitowoc Shipbuilding Co., Manitowoc, Wis., is building four steel deck barges, 131 ft. by 34 ft., for the Great Lakes Dredge and Dock Co., Chicago. Delivery will be made in the spring.

PLATES

. . . Occasional large tonnages only bright spot in market

THE general run of plate business is unsatisfactory, but the market is enlivened by occasional inquiries for large lots for specific projects. One such this week is the project of the Mississippi Valley Barge Line, ST. LOUIS, to build 15 barges, which will take 5800 tons of plates, bids to be taken this week.

In the East business continues dull. Some oil refinery work is in the preliminary stages, but there is no assurance that the work will go ahead immediately.

At CLEVELAND the Bethlehem Steel Co. has been awarded 175 tons for the Big Creek intercepting sewer, while at TOLEDO bids on another section of the 78-in. intake main, involving a large tonnage of plates, are due April 18.

ST. LOUIS reports interest in tank plates for the Illinois oil fields, where there is no restriction on production.

RAILROAD BUYING

. . . New York Central rail orders allocated . . . Wabash buys

THE New York Central rail orders, which were allocated last week, totaled 56,200 tons and were divided approximately as follows: Carnegie-Illinois Steel Corp., 29,300 tons; Bethlehem Steel Co., 19,400 tons; Inland Steel Co., 4300 tons; Algoma Steel Corp., 3100 tons. Orders for track accessories to go with these rails were distributed among a number of producers. The Wabash is reported to have divided 7500 tons of rails.

Several thousand freight cars probably will be ordered by various roads before the end of the second quarter. Included among these are 1250 for the Missouri Pacific, 1000 hopper cars for the Illinois Central, and 1000 box cars

for the Chicago & North Western. A purchase by the Great Northern is also a prospect.

The Chicago, Rock Island & Pacific has ordered two streamlined trains from the Edward G. Budd Mfg. Co.

The Canadian National, which ordered 2000 box cars, as reported last week, has also ordered five mail-express cars, and 10 baggage cars from the Canadian Car & Foundry Co. This road will also build in its own shops 50 refrigerator cars and 25 caboose cars.

The Milwaukee Road is acquiring six diesel-electric switching engines on a lease-purchase basis, four to be furnished by the Electro-Motive Corp., and two by the American Locomotive Co. The Wabash is taking bids on four diesel-electric locomotives. The St. Louis Southwestern is inquiring for 100 underframes for box cars. Swift & Co. are inquiring for two tank cars for export.

Denver & Rio Grande Western is considering the purchase of 500 box cars and 100 mill type gondolas.

Lehigh Valley has ordered 10 coaches from Pullman Standard Car Mfg. Co.

Capital expenditures for equipment and other improvements to railway property made by the Class I railroads in 1938 totaled $226,937,000, the Association of American Railroads has announced. This was a decrease of $282,856,000 below such expenditures in 1937, and a decrease of $72,054,000 compared with those in 1936. It also was a decrease of $645,671,000 compared with 1930. The decrease in capital expenditures in 1938 compared with the preceding year resulted not only from a falling off in purchases of locomotives, freight and passenger cars, and other equipment, but also to a decline in expenditures for heavier rail, additional ballast and other improvements to roadway and structures.

BOLTS, NUTS, RIVETS

. . . Some prices reaffirmed for the second quarter

RIVET prices are being carried forward unchanged for the second quarter. A leading cap screw manufacturer has announced its intention of renewing present published quotations. While bolt and nut manufacturers have not announced yet, there is strong likelihood prices will be reaffirmed. The sales outlook has improved over 30 days ago.

TUBULAR GOODS

. . . No change in total amount of purchasing

WITH little or no change in the total volume of buying having occurred in the past several weeks, PITTSBURGH producers continue to pin their hopes on the anticipated upturn in general business. Until that time, oil companies are not expected to increase their specifications beyond current levels.

CLEVELAND and YOUNGSTOWN producers report very little change from last week. At LORAIN bids are due March 30 on approximately 400 tons of pipe for piling for a bridge substructure.

MERCHANT BARS

. . . Demand broadening but aggregate tonnage is little affected

SLIGHTLY expanded but with little change in aggregate tonnages being ordered, hot rolled bar demand at PITTSBURGH is reflecting a slow but nonetheless increase in miscellaneous consumer activity. Day-to-day purchases govern the action of most buyers including automotive interests. Some mills are faced with more than the usual number of roll changes because of the variety in sizes and grades making up current business.

Farm equipment manufacturers and jobbers in the vicinity of CHICAGO are maintaining their position in the front rank of bar consumers. Cold drawers are fairly active.

STRUCTURAL STEEL

. . . PWA demand expected to reach peek in June

SLOWNESS in the flow of PWA orders to the mills—a question mark recently among producers—is attributed by the PWA to the fact that work done thus far is only preliminary and that peak requirements will not be reached until June or July. The Bureau of Labor Statistics estimates that 10 per cent of the PWA construction program was completed Dec. 30; that 35 per cent will be completed by June, 70 per cent by Dec. 30, 1939, and that the program will be 100 per cent complete by June 30, 1940.

The past week saw awards of 3000 tons for the Central New York Power Corp. steam plant at Oswego, N. Y., going to Bethlehem Steel Co., 2400 tons for the Rock Island Lines bridge requirements going to American Bridge Co., and 1150 tons for Pacific Gas & Electric Co. steam plants at Avon and Martinez, Cal., taken by the Judson-Pacific Co., San Francisco. At CLEVELAND the R. C. Mahon Co., Detroit, has been awarded another section of the east approach to Main Street bridge, involving 1600 tons of fabricated steel.

Structural specifications reported at PITTSBURGH increased moderately in the past week, with American Bridge Co. booking 1000 tons of fabricated material for a bridge at Cambridge, Mass. Publicly financed projects continue to provide the bulk of current inquiries and awards. On the WEST COAST announcement of award of several thousand tons for the Shasta Dam is expected shortly.

Merritt-Chapman & Scott Corp., NEW YORK, is low bidder on 9300 tons for the Potomac River bridge at Bobs Creek, Md. Pending business includes 4000 tons of galvanized steel transmission towers for use in the TVA's Wilson Dam.

SHEETS AND STRIP

. . . Orders gain only slightly . . . Hopes pinned on automobile industry

DETAILS on quantity discounts appear under "Prices."

Although aggregate sheet and strip tonnages have increased only slightly in the past two weeks, expansion and diversification persist at PITTSBURGH. Major consumers currently include automotive, stove makers, refrigerator manufacturers, and, to some extent, farm implement companies. Although no exceptionally large buys are anticipated from automotive companies, producers look for moderate-sized purchases before final production programs on the current model are completed.

CLEVELAND and YOUNGSTOWN producers have enjoyed moderately heavier sales volume during the past 10 days. It is generally considered as too early to state that a trend has been established, but if automotive schedules are stepped up, improvement appears certain. Sellers of cold strip and commodity strip have revised the quantity deduction set-up, with 75 tons and over getting the $3 a ton deduc-

tion, and base being under 20 to 3 tons, in line with the revision on hot strip.

CHICAGO mills are getting few large orders at the moment, though substantial tonnages should emanate from DETROIT before the end of the month. Because of the factional war within the UAW, car makers, sensing trouble, have stepped up production over actual orders for the first time in many weeks, as a precaution against shutdowns. Spring prospects for stove and refrigerator plants continue good.

Sheet ordering in SOUTHERN OHIO is holding to a level of about 55 per cent of capacity. No industry has emerged as a heavy purchaser, current business being well distributed. Automobile ordering has not reached large proportions, but regular specifications are indicated.

A lull in demand for general sheet items is noticeable in the PHILADELPHIA district, although most district offices look for total March bookings to run slightly better than the February average. Some eastern Pennsylvania users of galvanized sheets have engaged in a little anticipatory buying, apparently as protection against the recall of functional allowances on April 1.

REINFORCING BARS

. . . Ryerson awarded 2500 tons for Chicago subway section

LETTING of 2500 tons for the third section of CHICAGO's subway to Joseph T. Ryerson, Inc., was a highlight of a week in which total orders declined. Specifications at PITTSBURGH are reported holding up with bookings equal to the recent average. Several districts report a large volume of pending business, to which has been added 1200 tons for the Potomac River bridge at Bobs Creek, Md.

First highway letting of 1939 in Missouri is scheduled for March 20, the projects including 700 tons of reinforcing bars, of which a bridge at Joplin will require 400 tons. Bids have been opened for the superstructure of a bridge across the Mississippi River at Greenville, Miss., requiring 385 tons. The sub-structure for a bridge at Lorain, Ohio, involving around 280 tons, will be bid March 30. Truscon Steel Co. will supply 190 tons for an Oswego, N. Y., power station.

WIRE PRODUCTS

. . . Prices reaffirmed . . . Buying is disappointing in volume

TOTAL wire sales, including manufacturers' and merchant wire products, are holding at recent levels but the failure of the seasonal buying movement to develop is disappointing to producers at PITTSBURGH. With prices continuing firm, consumers have adopted cautious hand-to-mouth buying policies. Present quotations on wire rods and manufacturers' wire are unchanged for second quarter delivery.

CLEVELAND reports that while March sales of merchant wire products apparently will fall short of the volume attained in January, jobbers are coming back into the market more freely. The price situation on nails and barbed wire is said to be increasingly firmer. Current base prices on rods and wire have been reaffirmed for delivery during the second quarter.

Jobbers of merchant wire products in the CHICAGO area are slackening their rate of buying somewhat because of heavy additions to stocks over the past five weeks. Dealers are thus prepared for rural purchasing, which is expected in volume almost at any time. Demand for manufacturing wire in the Midwest probably will increase with spring activity in automobiles, tractors, and a host of miscellaneous accounts. Threats of labor trouble in the Southwestern oil states are affecting sales of wire rope.

TIN PLATE

. . . Current prices continued through the second quarter

CONTINUING the policy of quarterly price announcements on tin plate instead of the nine-month season formerly covered, the Carnegie-Illinois Steel Corp. on March 9 reaffirmed current quotations on tin plate for domestic consumption.

Tin plate specifications in the past week were about in the same volume as in the preceding week, with operations substantially unchanged at 53 per cent of capacity. While specifications for miscellaneous and general line cans appear to be loosening up, expected tonnages from sanitary can manufacturers on a large scale have yet to make their appearance.

Youngstown Sheet & Tube Co. directors declared their regular quarterly dividend of $1.37½ on preferred stock, payable April 1 to stock of record March 11. Directors selected April 25 for the annual meeting of shareholders and designated March 11 as final day for determining shareholders' rights to vote at the meeting.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Mar. 14, 1939	Mar. 7, 1939	Feb. 14, 1938	Mar. 15, 1938	1939	1938
Fabricated structural steel awards	22,800	18,325	9,100	13,800	199,300	144,650
Fabricated plate awards	3,705	1,970	275	2,050	32,155	40,965
Steel sheet piling awards	180	1,300	0	625	8,540	5,260
Reinforcing bar awards	5,150	14,900	5,825	2,400	91,695	59,555
Total Letting of Construction Steel..	31,835	36,495	15,200	18,875	331,690	250,430

FABRICATED STEEL

. . . Lettings advance to 22,800 tons from 18,325 tons last week . . . New projects higher at 23,200 tons against 12,750 tons a week ago . . . Plate awards call for 3705 tons.

NORTH ATLANTIC STATES

AWARDS

3000 Tons, Oswego, N. Y., steam plant for Central New York Power Corp., to Bethlehem Steel Co., Bethlehem, Pa.

1000 Tons, Cambridge, Mass., Cottage Farm bridge for Metropolitan District. Commission to American Bridge Co., Pittsburgh.

510 Tons, Fort Jay, N. Y., barracks and apartment building, to Levinson Steel Co., Pittsburgh.

500 Tons, Washington, Gallinger Hospital, to Fort Pitt Bridge Works Co., Pittsburgh.

290 Tons, Clayton, N. Y., Central Grade and High School, to Smith & Caffrey Co., Syracuse, N. Y.

285 Tons, Westchester County, N. Y., bridge over Bronx River, to American Bridge Co., Pittsburgh.

250 Tons, Springfield, Mass., F. W. Woolworth Co. store, to American Bridge Co., Pittsburgh.

235 Tons, Lewistown, Pa., acid recovery building for American Viscose Corp., to Amer-Bridge Co., Pittsburgh.

220 Tons, Marcus Hook, Pa., and Toledo, Ohio, platforms for Sun Oil Co., to Frank M. Weaver & Co., Lansdale, Pa.

215 Tons, Storrs, Conn., State College dormitories, to Haarman Steel Co., Holyoke, Mass.

185 Tons, Allentown, Pa., Hanover Acres Housing project, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

165 Tons, Brooklyn, transfer bridge, Brooklyn Eastern District Terminal Co., to American Bridge Co., Pittsburgh.

165 Tons, State College, Pa., addition to apartment building, to Reading Steel Products Co., Reading, Pa.

THE SOUTH

710 Tons, Langley Field, Va., wind tunnel, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

670 Tons, Williamson County, Tex., bridge, to North Texas Iron & Steel Co., Fort Worth, Tex.

630 Tons, Castleman's Ferry, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

422 Tons, Taylor, Tex., highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

335 Tons, Collin County, Tex., bridge, to Mosher Steel Co., Dallas, Tex.

235 Tons, Barton County, Ga., bridge, to Virginia Bridge Co., Roanoke, Va.

220 Tons, Clarke County, Miss., two bridges, to Jones & Laughlin Steel Corp., Pittsburgh.

165 Tons, Gwynn's Island, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

155 Tons, Rome, Ga., Tubize-Chatillon Corp., building, to Ingalls Iron Works Co., Birmingham.

125 Tons, Giles County, Tenn., bridge, to Virginia Bridge Co., Roanoke, Va.

110 Tons, Houston, Tex., Houston Gas & Fuel Corp., to Commercial Iron Works, Houston.

CENTRAL STATES

2400 Tons, Rock Island Lines, bridge requirements for 1939, to American Bridge Co., Pittsburgh.

1600 Tons, Cleveland, east approach to Main Street bridge, to R. C. Mahon Co., Detroit, through National Engineering & Contracting Co., Cleveland; also 60,000 sq. ft. of decking and 6000 sq. ft. steel sidewalk and railing.

935 Tons, Indianapolis, Link Belt Co. building, to Insley Mfg. Co., Indianapolis.

595 Tons, Indianapolis, R.C.A. Mfg. Co. building, to Whitehead & Kales Co., Detroit.

585 Tons. Detroit, Divco Twin Truck Co. building, to Whitehead & Kales Co., Detroit.

450 Tons, Toledo, Ohio, Girls' Trade School, to Whitehead & Kales Co., Detroit.

280 Tons, Morristown, Ind., bridge, to Bethlehem Steel Co., Bethlehem, Pa.

250 Tons, Grand Rapids, Mich., floor framing for press pits, press shop, for General Motors Corp., to American Bridge Co.

250 Tons, Minneapolis, University of Minnesota, women's dormitory, to Crown Iron Works Co., Minneapolis.

110 Tons, Chicago, Procter & Gamble building, to A. F. Anderson Co., Chicago.

WESTERN STATES

1150 Tons, Avon and Martinez, Cal., Pacific Gas & Electric Co., steam plants, to Judson-Pacific Co., San Francisco.

832 Tons, Turlock, Cal., overcrossing, to Bethlehem Steel Co., San Francisco; through Union Paving Co., San Francisco, contractor.

600 Tons, Albany, Ore., overcrossing, to Poole & McGonigle, Portland, Ore.; through Roy L. Houck, Salem, Ore., contractor.

600 Tons, Salt Lake City, Utah, building for Mountain States Telephone & Telegraph Co., to Bethlehem Steel Co., San Francisco.

350 Tons, Alameda, Cal., Navy shop superstructure, to Independent Iron Works, Oakland, Cal.; through James I. Barnes, Santa Monica, Cal., contractor.

275 Tons, Salt Lake City, Utah, columns for building, Mountain States Telephone & Telegraph Co., to Midwest Steel & Iron Co., Denver.

155 Tons, Golden, Colo., extension to geology building, to Denver Steel & Iron Co., Denver.

150 Tons, Mare Island, Cal., Navy supply warehouse, to Herrick Iron Works Oakland, Cal.; through MacDonald & Kahn, San Francisco, contractor.

140 Tons, Denver, 14th Street viaduct widening, to Wisconsin Bridge & Iron Co., Milwaukee.

118 Tons, Ritzville, Wash., overcrossing, to Pacific Car & Foundry Co., Seattle; through Henry Hagman, Cashmere, Wash., contractor.

115 Tons, Oroville, Cal., overcrossing, to Judson-Pacific Co., San Francisco.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

9300 Tons, Bob's Creek, Md., H-beams for substructure, Potomac River bridge, Merritt-Chapman & Scott Corp., New York, low bidder.

6000 Tons, Ulster, Orange and Dutchess Counties, N. Y., contract 318, Delaware Aqueduct, Pleasantville Constructers, Pleasantville, N. Y., low bidder.

1300 Tons, Staten Island, N. Y. hospital.

1009 Tons, Jersey City, hospital, Lehigh Structural Steel Co., Allentown, Pa., low bidder (previously reported).

500 Tons, Trenton, N. J., school building; bids March 21.

440 Tons, Windham, Conn., bridges.

400 Tons, Washington, high voltage laboratory building for Treasury Department.

400 Tons, Newark, N. Y., school; bids close March 22.

400 Tons, New York, apartment building 28 East 73rd Street.

400 Tons, New York, General Baking Co. building, Equity Construction Co., New York, low on general contract.

300 Tons, Brooklyn, Fort Greene Health Center, Sheppard-Pollack, Inc., New York, low bidder (previously reported).

300 Tons, East Hartford, Conn., alterations and additions to building for United Aircraft Corp.

275 Tons, Sinclairville, N. Y., high school.

275 Tons, Andover, N. Y., school; bids close March 28.

195 Tons, Almond, N. Y., school building.

170 Tons, Westport, Conn., State bridge.

165 Tons, Trumbull, Conn., State bridge.

150 Tons, Athol, Mass., Exchange Street bridge.

150 Tons, Cassadaga Valley, N. Y.; bids close March 21.

125 Tons, New York, N. Y., approach to George Washington Bridge.

SOUTH and SOUTHWEST

4000 Tons. Wilson Dam-Pickwick-Memphis, Tenn., galvanized steel transmission towers for Tennessee Valley Authority; bids until March 28.

800 Tons, Owensboro, Ky., water and power-plant building.

350 Tons, Richmond, Va., factory and power house for United States Tobacco Co.; bids in.

125 Tons, Hillside, Ariz., Santa Maria River bridge; bids March 21.

115 Tons, Barboursville and Peach Creek, W. Va., railroad signal bridges.

CENTRAL STATES

300 Tons, Jefferson City, Mo., Missouri Highway Commission; bids due March 20.

300 Tons, Lorain, Ohio, substructure, Erie Avenue bridge.

250 Tons, Cleveland, storage building for Aluminum Co. of America.

235 Tons, Norwalk, Ohio, high school.

225 Tons, Massillon, Ohio, stadium.

205 Tons, Quincy, Ill., repairs to railroad bridge over Mississippi River.

175 Tons, Cincinnati, bulk plant for Standard Oil Co.

140 Tons, St. Bernard, Ohio, building for Fischer's Bakery.

FABRICATED PLATES

AWARDS

1800 Tons, Chicago, liner plates for section of Chicago subway, to Commercial Shearing & Stamping Co., Youngstown, Ohio, through Michael Pontarelli.

700 Tons, Milwaukee, water storage tank, to Koppers Co., Pittsburgh.

415 Tons, Grand Forks, N. D., water storage tank, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 Tons, Sparrows Point, Md., Graver Tank & Mfg. Co., rolled plates, to Lukens Steel Co., Coatesville, Pa.

205 Tons, Tucson, Ariz., elevated water tank, to Allison Steel & Mfg. Co., Phoenix, Ariz.

175 Tons, Cleveland, Big Creek intercepting sewer, to Bethlehem Steel Co., Bethlehem, Pa., through Lombardo Brothers Construction Co., Cleveland.

110 Tons, Corpus Christi, Tex., 25,000 bbl. tank, McNamar Boiler & Tank Co., to Wyatt Metal & Boiler Co., Dallas, Tex.

100 Tons, Bellingham, Mass., standpipe, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PENDING PROJECTS

5800 Tons, St. Louis, 15 steel barges for Mississippi Valley Barge Line.

1620 Tons, Bob's Creek, Md., caissons and protection plates, substructure, Potomac River bridge, Merritt-Chapman & Scott Corp., New York, low bidders.

Unstated tonnage, Toledo, section of 78-in. intake main; bids April 18.

SHEET PILING

AWARDS

180 Tons, Cleveland, Carter Road-West Third Street bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through Lombardo Brothers Construction Co., Cleveland.

PENDING PROJECTS

2000 Tons, Greenville, Miss., substructure for bridge across Mississippi River; F. V. Ragsdale Construction Co., Memphis, Tenn., low bidder on general contract.

1000 Tons, New York, East River Drive, bulkhead wall.

400 Tons, Lorain, Ohio, bridge at East 21st Street and Colorado Avenue; bids due March 30.

. . . NON-FERROUS . . .

. . . Lead advanced $2 a ton . . . Prime Western sales soar to 15,191 tons . . . Domestic copper shipments drop 3450 tons; reserves rise 7848 tons.

NEW YORK, March 14—Just as the non-ferrous markets were apparently regaining their equilibrium and sales of the various metals were slowly expanding, the political situation in Central Europe is again beclouded and fresh uncertainties have been injected into the market outlook. Added to the depressing influence of the foreign situation was the announcement of proposals for imposition of a new export tax on Chilean copper. The copper market, however, displayed unexpected resistance to these developments and, outside of a curtailment of foreign buying and small losses in the foreign price, the domestic situation has shown little change. Producers' sales are averaging about 1000 tons a day at the unchanged price of 11.25c. per lb., Connecticut Valley. Sales in the open market in the past week were in moderate volume, with prices that advanced as high as 10.875c. per lb., Valley delivery, at the close of the week. On Monday, however, most of the open market business was done at around 10.80c. The foreign price this morning was in the neighborhood of 10.23c. per lb., c.i.f., as compared with 10.35c. on Friday and 10.15c. a week ago. Domestic copper shipments in January were 51,377 tons, down 3450 tons from the previous month, and production was off 6957 tons to 59,225 tons. Refined stocks at the end of February stood at 308,958 tons against 301,110 tons.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Mar. 8	Mar. 9	Mar. 10	Mar. 11	Mar. 13	Mar. 14
Copper, Electrolytic[1]	11.25	11.25	11.25	11.25	11.25	11.25
Copper, Lake	11.375	11.375	11.375	11.375	11.375	11.375
Tin, Straits, New York	45.15	46.53	46.40	....	45.95	46.00
Zinc, East St. Louis[2]	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis[3]	4.60	4.70	4.70	4.70	4.70	4.70

[1] Delivered Conn. Valley, deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	47.00c.	49.00c.
Copper, Lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.31c.	17.31c.
*Seamless brass tubes	20.06c.	20.06c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	12.62c.	12.62c.
Zinc slabs	6.25c.	7.00c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.85c.	5.60c.
Lead, bar	6.35c.	8.35c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	28.30c.	28.75c.
Babbitt metal, commercial grade	21.50c.	20.75c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.375c.	9.125c.
Copper, hvy. and wire	7.375c.	7.875c.
Copper, light and bottoms	6.625c.	6.875c.
Brass, heavy	4.50c.	5.00c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.50c.	8.00c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or compos. turnings	6.25c.	6.875c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	12.25c.	13.75c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 11.25c. a lb. QUICKSILVER, $88-$90 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11c. a lb.

Lead

Continued active demand and higher London prices paved the way for an increase of $2 a ton in domestic prices on Thursday, establishing the New York price at 4.85c. per lb. Sales were in good volume all week, even after the increase in quotations, but a slowing down of inquiry was noted on Monday and today. This tapering was not unexpected in view of the heavy amount of March metal bought in the past three weeks. This morning's London spot price was 3.10c. per lb., a gain of 10 points or $2 a ton over the price of a week ago.

Zinc

Prime Western demand in the past week, spurred by the advance in the foreign price, was the heaviest experienced in many months. The week's total of 15,191 tons was 2½ times the previous week's sales, with most of the buying for nearby delivery, although some fairly heavy large tonnages were booked for June and beyond. Domestic quotations remain unchanged at 4.89c. per lb., New York, while this morning's London price of 2.90c. per lb. represents a gain of six points over a week ago. The key to the domestic price situation is still the London market and further advances in values there will very likely find reflection in higher quotations here.

Tin

Business was very poor all last week, but a slight improvement in demand was noted yesterday and today, with inquiry from tin plate makers for nearby positions most prominent. Prices ruled fairly steady all week, and after a brief rise to 46.40c. on Friday, Straits quotations settled back to 46c. per lb., NEW YORK, today, the level that prevailed on Tuesday of last week. Cash standards in London this morning were £215 10s., as compared with a flat £215 a week ago.

IRON AND STEEL SCRAP

. . . Scrap markets strong, but no price changes of importance have occurred . . . European delegation investigating export situation and may buy 150,000 tons or more.

MARCH 14—Though strength continues in all major scrap markets, no important changes in prices have occurred. At Pittsburgh $16 has been paid for No. 1 heavy melting steel both by dealers and by mills, but mills are resisting the higher level which probably would be asked on fresh purchases. At Chicago brokers are paying $14.50 for No. 1 steel, which was the price paid on the last important mill purchase. At Detroit interest is centered on bids to be received this week on about 10,000 tons of hydraulic compressed bundles offered by an automobile body company as it believed the prices offered will be indicative of the nearby price trend.

In the East attention has been centered on the visit of a delegation representing the International Scrap Convention, the European buying agency for scrap. No orders have been placed thus far, but it is understood that 150,000 tons or more may be purchased before the delegation departs a few weeks hence. Meanwhile the Europeans are investigating the scrap export situation before coming to a decision.

THE IRON AGE scrap composite price is unchanged this week at $15.17.

Pittsburgh

The market undertone continues exceptionally strong, with both consumer and broker purchases in the majority of cases being made at $16 a ton for No. 1 steel. This grade continues unchanged from last week at a flat $16 a ton. So far there is little or no indication that consumers will pay more than this price for heavy melting, despite the apparent scarcity of scrap in this district and elsewhere.

Chicago

The major heavy melting steel activity in this market is broker coverage on old $14.50 orders for which it is necessary to pay around $14.50, and in some cases more. Material is not moving any too freely even at these prices, but there does not seem to be a physical shortage. Considerable activity has developed in the past week or so in specialties, and some price increases have been made. Railroad heavy melting steel continues to draw a premium over ordinary No. 1 steel, a recent transaction bringing around $15.50 gross delivered in Chicago.

Philadelphia

Except for spotty shipments to nearby plants on old contracts, the domestic situation here is quite unimpressive. Mills are not operating at a pace requiring much interest in scrap, and the outlook for the next few months is only moderately encouraging. Thus, variations in the export situation continue to rule market sentiment. With English representatives in this country now looking for scrap and quite likely to buy sizable quantities, dealers here are holding onto their accumulations in anticipation of more urgent demands to fill foreign orders. Pending clarification of this most recent export development, only small quantities of material are appearing at Port Richmond, the ruling prices in general being slightly better than previous quotations but still well within quoted ranges. Domestic demands for foundry grades are sporadic and in poor volume, just as are the steel-making grades.

Youngstown

Last week's tight situation, caused by the scramble to cover the purchase for Warren, Ohio, has been relieved a little here this week. Faster shipments to mills are reported, although dealers have had to reach out farther for scrap. Dealer buying prices on No. 2 heavy melting and No. 1 busheling are slightly higher.

Cleveland

The dealers' market has become increasingly tighter here recently, with only a little scrap moving and dealers having difficulty covering old orders. It is generally believed that $14.50 on No. 1 heavy melting steel would be found low if tested by a mill. A vessel shipment of 2900 tons of blast furnace scrap arrived here Monday from Detroit, first cargo of the season. This material was unloaded at the Otis Steel Co. It was purchased last fall, too late for prompt movement. With lower Lake navigation under way, blast furnace grades will be more plentiful here, but little additional open-hearth material can be expected.

Buffalo

Activity continues light in the district. Until steel operations pick up, dealers do not look for any increase in volume of purchases. Foundries are buying more small lots, both No. 1 and No. 2 cast moving at a faster rate and at quoted prices.

St. Louis

The market for scrap iron and steel is dull with prices nominally unchanged. Inquiries from local mills and outside industries are at a minimum, and only few scattered sales of small lots reported. Mill stocks in some instances are light and buying from that source is expected during next week or 10 days. Railroad lists: Illinois Central, 5210 tons; Frisco, 500; Louisville & Nashville, 4682; Southern railway, 2991.

Cincinnati

Mills have backed away from the scrap market here except for small quantities to fill in. Dealers have bid up prices on important items. The remainder of the list is firm.

Detroit

Mid-week closing of an automotive body company's list for various plants, totaling about 10,000 tons of hydraulic compressed sheets, was being watched as an indication of market strength. Otherwise, the Detroit market has been without any significant activity during the last week.

Correction—An error last week resulted in the quoting of new factory busheling at too high a level. The figure for last week and the current week should be $10.75 to $11.25.

Boston

Based on actual business the market is colorless. The export market has quieted down somewhat, while that for domestic consumption is virtually at a standstill. The only export reported the past week was 74 tons for Rotterdam. Prices all down the line are firm.

New York

The attention of a portion of the scrap trade in the East has been focused on the visit of three representatives of the International Scrap Convention, the scrap buying cartel for several European countries, who arrived in New York last week to spend about a month in the United States. No business has yet resulted from this visit, and it is understood that no action will be taken until a thorough study has been made of conditions in this country affecting the purchase and export of scrap. The delegation consists of Capt. H. Leighton-Davies, Harold Shillitoe and E. B. Muscroft. The London correspondent of THE IRON AGE says that the British "will shortly have to resume purchases of American scrap for the first time since the 1937 boom. It is stated that an initial purchase of around 150,000 tons of U. S. scrap will probably be made within a month or so, but that additional tonnage will be required later as steel output for 1939 is now estimated at 10,000,000 tons." The record total for Great Britain was about 13,000,000 tons in 1937.

The New York scrap market is firm, but no price changes have occurred within the past week.

Toronto

Trading in iron and steel scrap is attracting minor interest. Dealers state that while there has been some betterment in offerings, materials entering yards are those with little re-sale demand. Heavy melting steel has a ready market.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	....	$16.00
Railroad hvy. mltng...	$16.50 to	17.00
No. 2 hvy. mltng. steel.	14.25 to	14.75
Scrap rails	16.50 to	17.00
Rails 3 ft. and under..	18.25 to	18.75
Comp. sheet steel	....	16.00
Hand bundled sheets..	....	15.00
Hvy. steel axle turn..	14.00 to	14.50
Machine shop turn....	10.00 to	10.50
Short shov. turn.....	11.00 to	11.50
Mixed bor. & turn....	8.75 to	9.00
Cast iron borings	8.75 to	9.00
Cast iron carwheels...	15.00 to	15.50
Hvy. breakable cast...	12.50 to	13.00
No. 1 cupola cast.....	15.25 to	15.75
RR. knuckles & cplrs..	17.50 to	18.00
Rail coil & leaf springs	18.00 to	18.50
Rolled steel wheels....	18.00 to	18.50
Low phos. billet crops.	19.00 to	19.50
Low phos. punchings..	17.50 to	18.00
Low phos .plate	17.00 to	17.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to	$15.50
No. 2 hvy. mltng. steel.	13.00 to	13.50
Hydraulic bund., new.	14.50 to	15.00
Hydraulic bund., old..	11.50 to	12.00
Steel rails for rolling.	17.00 to	17.50
Cast iron carwheels...	16.50 to	17.00
Hvy. breakable cast...	15.50 to	16.00
No. 1 cast	16.50 to	17.00
Stove plate (steel wks.)	13.00 to	13.50
Railroad malleable ...	15.50 to	16.00
Machine shop turn....	8.50 to	9.00
No. 1 blast furnace....	6.50 to	7.00
Cast borings	6.50 to	7.00
Heavy axle turnings..	10.00 to	10.50
No. 1 low phos. hvy...	....	17.00
Couplers & knuckles..	....	17.00
Rolled steel wheels....	....	17.00
Steel axles	20.00 to	20.50
Shafting	20.50 to	21.00
Spec. iron & steel pipe	12.00 to	12.50
No. 1 forge fire.....	11.00 to	11.50
Cast borings (chem.)..	9.50 to	10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$14.00 to	$14.50
Auto. hvy. mltng. steel alloy free	12.50 to	13.00
No. 2 auto steel	11.50 to	12.00
Shoveling steel	14.00 to	14.50
Factory bundles	13.00 to	13.50
Dealers' bundles	12.50 to	13.00
Drop forge flashings...	10.50 to	11.00
No. 1 busheling	12.50 to	13.00
No. 2 busheling, old...	5.75 to	6.25
Rolled carwheels	16.00 to	16.50
Railroad tires, cut	16.00 to	16.50
Railroad leaf springs..	16.00 to	16.50
Steel coup. & knuckles	16.00 to	16.50
Axle turnings	13.00 to	13.50
Coil springs	17.00 to	17.50
Axle turn. (elec.)	14.00 to	14.50
Low phos. punchings..	16.50 to	17.00
Low phos. plates 12 in. and under	16.00 to	16.50
Cast iron borings	5.50 to	6.00
Short shov. turn.	7.50 to	8.00
Machine shop turn....	7.00 to	7.50
Rerolling rails	17.00 to	17.50
Steel rails under 3 ft..	16.25 to	16.75
Steel rails under 2 ft..	17.00 to	17.50
Angle bars, steel	16.00 to	16.50
Cast iron carwheels...	12.75 to	13.25
Railroad malleable	16.00 to	16.50
Agric. malleable	11.25 to	11.75

	Per Net Ton	
Iron car axles	$18.50 to	$19.00
Steel car axles	18.00 to	18.50
Locomotive tires	14.00 to	14.50
Pipes and flues	9.50 to	10.00
No. 1 machinery cast.	12.50 to	13.00
Clean auto. cast.	13.00 to	13.50
No. 1 railroad cast....	11.50 to	12.00
No. 1 agric. cast.....	10.25 to	10.75
Stove plate	7.75 to	8.25
Grate bars	9.00 to	9.50
Brake shoes	9.25 to	9.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to	$16.00
No. 2 hvy. mltng. steel.	14.50 to	15.00
Low phos. plate	16.00 to	16.50
No. 1 busheling	14.75 to	15.25
Hydraulic bundles	15.00 to	15.50
Machine shop turn....	10.25 to	10.75

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to	$14.50
No. 2 hvy. mltng. steel.	13.00 to	13.50
Comp. sheet steel	13.50 to	14.00
Light bund. stampings	10.75 to	11.25
Drop forge flashings..	13.00 to	13.50
Machine shop turn....	7.50 to	8.00
Short shov. turn.....	8.00 to	8.50
No. 1 busheling	13.50 to	14.00
Steel axle turnings....	11.50 to	12.00
Low phos. billet and bloom crops	18.00 to	18.50
Cast iron borings	8.00 to	8.50
Mixed bor. & turn.....	8.00 to	8.50
No. 2 busheling	8.00 to	8.50
No. 1 cupola cast	16.50 to	17.00
Railroad grate bars ..	9.50 to	10.00
Stove plate	9.50 to	10.00
Rails under 3 ft.	17.75 to	18.25
Rails for rolling	17.00 to	17.50
Railroad malleable ...	15.50 to	16.00
Cast iron carwheels ..	14.50 to	15.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to	$14.50
No. 2 hvy. mltng. steel.	12.00 to	12.50
Scrap rails	15.00 to	15.50
New hvy. b'ndled sheets	12.00 to	12.50
Old hydraul. bundles..	10.75 to	11.25
Drop forge flashings...	12.00 to	12.50
No. 1 busheling	12.00 to	12.50
Hvy. axle turnings....	10.50 to	11.00
Machine shop turn....	6.50 to	7.00
Knuckles & couplers..	16.50 to	17.00
Coil & leaf springs....	16.50 to	17.00
Rolled steel wheels....	16.00 to	16.50
Low phos. billet crops.	15.50 to	16.00
Shov. turnings	8.75 to	9.25
Mixed bor. & turn....	7.50 to	8.00
Cast iron borings	7.50 to	8.00
Steel car axles	16.50 to	17.00
No. 1 machinery cast..	15.00 to	16.00
No. 1 cupola cast.	14.50 to	15.00
Stove plate	13.00 to	13.50
Steel rails under 3 ft..	18.00 to	18.50
Cast iron carwheels...	13.50 to	14.00
Railroad malleable	15.00 to	15.50
Chemical borings	9.00 to	9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$12.00 to	$12.50
No. 1 hvy. melting....	12.00 to	12.50
No. 2 hvy. melting....	11.50 to	12.00
No. 1 locomotive tires.	13.00 to	13.50
Misc. stand. sec. rails.	13.75 to	14.25
Railroad springs	14.00 to	14.50
Bundled sheets	7.50 to	8.00
No. 1 busheling	7.50 to	8.00
Cast. bor. & turn.....	2.50 to	3.00
Machine shop turn....	4.00 to	4.50
Heavy turnings	9.00 to	9.50
Rails for rolling	16.00 to	16.50
Steel car axles	17.00 to	17.50
No. 1 RR. wrought....	10.25 to	10.75
No. 2 RR. wrought....	12.00 to	12.50
Steel rails under 3 ft..	16.00 to	16.50
Steel angle bars	14.00 to	14.50
Cast iron carwheels...	14.50 to	15.00
No. 1 machinery cast..	14.50 to	15.00
Railroad malleable ...	12.25 to	12.75
No. 1 railroad cast....	12.50 to	13.00
Stove plate	8.50 to	9.00
Grate bars	9.00 to	9.50
Brake shoes	10.00 to	10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	12.25 to	12.75
No. 2 hvy. mltng. steel.	10.00 to	10.50
Scrap rails for mltng.	15.75 to	16.25
Loose sheet clippings.	7.50 to	8.00
Hydrau. b'ndled sheets	11.75 to	12.25
Cast iron boring	4.00 to	4.50
Machine shop turn....	5.50 to	6.00
No. 1 busheling	8.25 to	8.75
No. 2 busheling	3.00 to	3.50
Rails for rolling	17.75 to	18.25
No. 1 locomotive tires.	14.50 to	15.00
Short rails	18.50 to	19.00
Cast iron carwheels...	13.00 to	13.50
No. 1 machinery cast.	14.25 to	14.75
No. 1 railroad cast....	13.00 to	13.50
Burnt cast	7.00 to	7.50
Stove plate	7.00 to	7.50
Agricul. malleable	12.00 to	12.50
Railroad malleable	14.50 to	15.00
Mixed hvy. cast.....	11.25 to	11.75

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$12.50 to	$14.00
Scrap steel rails	14.50 to	15.00
Short shov. turnings..	7.50 to	8.10
Stove plate	9.00 to	10.00
Steel axles	15.00 to	16.00
Iron axles	15.00 to	16.00
No. 1 RR. wrought	....	10.00
Rails for rolling	16.00 to	16.50
No. 1 cast	....	14.50
Tramcar wheels	....	14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$10.50 to	$11.00
No. 2 hvy. mltng. steel.	9.00 to	9.50
Borings and turnings..	6.50 to	7.00
Long turnings	6.00 to	6.50
Short shov. turnings..	7.00 to	7.50
No. 1 machinery cast..	13.50 to	14.00
Automotive cast	13.75 to	14.25
Hvy. breakable cast...	10.00 to	10.50
Stove plate	8.00 to	8.50
Hydraul. comp. sheets.	11.75 to	12.25
New factory bushel...	10.75 to	11.25
Sheet clippings	8.25 to	9.25
Flashings	10.00 to	10.50
Low phos. plate scrap.	12.00 to	12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to	$11.00
No. 2 hvy. mltng. steel.	9.00 to	9.50
Hvy. breakable cast...	11.50 to	12.00
No. 1 machinery cast.	11.50 to	12.00
No. 2 cast	9.50 to	10.00
Stove plate	9.50 to	10.00
Steel car axles	20.00 to	20.50
Shafting	15.50 to	16.00
No. 1 RR. wrought....	11.00 to	11.50
No. 1 wrought long....	9.50 to	10.00
Spec. iron & steel pipe	9.00 to	9.50
Rails for rolling	16.00 to	16.50
Clean steel turnings*..	4.00 to	4.50
Cast borings*	3.50 to	4.00
No. 1 blast furnace....	3.50 to	4.00
Cast borings (chem.)..	9.50 to	10.00
Unprepared yard scrap	6.00 to	6.50
Light iron	3.00 to	3.50
Per gross ton, delivered local foundries:		
No. 1 machn. cast†....	$13.50 to	$14.00
No. 2 cast†	10.50 to	11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel		Nominal
Scrap rails		Nominal
No. 2 steel		Nominal
Breakable cast		$10.15
Machine shop turn....	$3.38 to	$4.15
Mixed bor. & turn....	$2.00 to	2.25
Bun. skeleton long....	8.50 to	8.60
Shafting	15.50 to	15.65
Cast bor. chemical....	4.50 to	5.00
Per gross ton delivered consumers' yards:		
Textile cast	$12.50 to	$14.00
No. 1 machine cast....	12.50 to	14.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to	$14.00
No. 2 hvy. mltng. steel.	11.50 to	13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.75	$9.25
No. 2 hvy. mltng. steel.	8.25	7.75
Mixed dealers steel....	7.00	6.50
Drop forge flashings...	9.00	8.50
New loose clippings...	4.50	4.00
Busheling	4.25	3.75
Scrap pipe	5.50	5.00
Steel turnings	5.00	4.50
Cast borings	3.75	3.25
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$12.00 to	$12.50
No. 2 hvy. mltng. steel.	10.50 to	11.00
No. 2 cast	10.50 to	11.00
Stove plate	9.50 to	10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.		$14.00
No. 2 hvy. mltng. steel.		13.00
Rails (scrap)		14.00
Mixed textile and machinery cast		12.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$14.50 to	$15.00
No. 2 hvy. mltng. steel.	13.50 to	14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia, delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	.285c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.30c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c
F.o.b. cars dock Pacific ports	4.65c

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c
On cars dock Pacific ports	3.95c

TIN MILL PRODUCTS

Tin Plate

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 14 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c

HOT ROLLED STRIP

(*Widths up to 12 in.*)

	Base per Lb
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c

COLD ROLLED STRIP*

	Base per Lb
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51 .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.30
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool..	$2.62
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool.....	$2.80

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	..56	36	¼ & ⅜	.+ 9	+30
¼ to ⅜	.59	43½	½	..24	6½
½	..63½	54	¾	..30	13
¾	..66½	58	1 & 1¼	..34	19
1 to 3	..68½	60½	1½	..38	21½
			2	..37½	21

Lap Weld

2	..61	52½	2 ..30½	15
2½ & 3	..64	55½	2½ to 3½	31½ 17½
3½ to 6.66		57½	4 ..33½	21
7 & 8	..65	55½	4½ to 8.	32½ 20
9 & 10	..64½	55	9 to 12.	.28½ 15
11 & 12	..63½	54		

Butt weld, extra strong, plain ends

⅛	..54½	41½	¼ & ⅜	.+10 +43
½ to ⅜	.56½	45½	½	..25 9
½	..61½	53½	¾	..31 15
¾	..65½	57½	1 to 2	..38 22½
1 to 3	..67	60		

Lap weld, extra strong, plain ends

2	..59	51½	2 ..33½	18½
2½ & 3		55½	2½ to 4.39½	25½
3½ to 6.66½		59	4½ to 6.37½	24
7 & 8	..65½	56	7 & 8	..38½ 24½
9 & 10	..64½	55	9 to 12.	.32 20½
11 & 12	..63½	54		

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d.	13 B.W.G.	10.67	9.26	....
1½ in. o.d.	13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G.	13.42	11.64	11.06
2 in. o.d.	13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G.	16.76	14.54	13.79
2½ in. o.d.	12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.	12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G.	21.42	18.59	17.54
3 in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.	11 B.W.G.	28.37	24.62	23.15
4 in. o.d.	10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.	10 B.W.G.	43.04	37.35	35.22
5 in. o.d.	9 B.W.G.	54.01	46.87	44.25
6 in. o.d.	7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42. Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts: ½ in. & 6 in. and smaller.	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1⅛ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped: ½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	65-5	70
9/16 to 1 in.	60-10	65
1⅛ in. and larger	60-5	60-5

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .... 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	73 and 10
Milled headless set screws, cut thread ¾ in. and smaller.	68 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	65 and 10
Upset set screws, cup and oval points	73 and 10
Milled studs	57 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-090 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes.	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot Strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d.
Steel bars, open hearth.	£10 8s.
Beams, open-hearth	£10
Channels, open-hearth	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No .24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £.
f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	25.50 base
Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 13%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 1%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 500 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 1%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06 carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$83.00
2.50% carbon	88.00
2% carbon	93.00
1% carbon	103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	29c.
Man., Brazilian, 46 to 48½%	27c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$18.50
Tungsten, domestic, scheelite delivered	$17.00 to $18.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.50
Turkish, 48-49%	22.50
Turkish, 45-46%	19.00
Turkish, 40-44%	17.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$25.00
48-49%	23.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne	4.00c.
No. 6, f.o.b. Bayonne	2.26c.
No. 5 Bur. Stds., del'd Chicago.	3.25c.
No. 6 Bur. Stds., del'd Chicago.	2.75c.
No. 3 distillate, del'd Cleve'd.	5.50c.
No. 4 industrial, del'd Cleve'd.	5.25c.
No. 5 industrial, del'd Cleve'd.	3.00c.
No. 6 industrial, del'd Cleve'd.	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Furnace, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.50c.
**Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes ½ in. and smaller (1 to 24 kegs)	3.40c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
** On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.
* All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.76c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, ⅛ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$2.90

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over).	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115).	6.85c.

* For 5000 lb. or less.
† 500 lb. base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes.	3.82c.
Bars, soft steel (rounds and flats)	3.37c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	5.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago District	49.00
Birmingham	40.00
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.36c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.33c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.
*Base prices subject to deduction on orders aggregating 4000 lb. or over
†For 25 bundles or over.
‡For one to five tons.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75	"
Hot rolled sheets No. 10 ga.	3.80	"
Hot rolled sheets No. 24 ga.	4.40	" 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	" 3500 lb. or more
Strip	4.05	"
Reinforcing bars.	3.85	"
Floor plates	5.96	"
Cold finished bars	4.91	"
Machine and carriage bolts	50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
	Base per Lb.		
Plates, tank and U. M.	4.00c.	4.00c.	4.05c.
Shapes, standard	4.00c.	4.00c.	4.05c
Soft steel bars	4.05c.	4.00c.	4.30c
Reinforcing bars, f.o.b. cars dock Pacific ports	2.675c.	open.	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	3.95c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.25c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.25c.
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.20	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.43c.
Structural shapes	3.80c.
Plates	3.75c.
Floor plates	5.42c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.58c.
Cold-rolled sheets	4.65c.
Galvanized sheets	4.74c.
Hot-rolled strip, under No. 12	3.83c.
Hot-rolled strip, No. 12 and over	3.58c.
Cold-finished bars	3.60c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	6.17c.

Quantity extras apply to all items.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Socony-Vacuum Oil Co., 26 Broadway, New York, plans new oil refinery at Shelby, Mont., with cracking division for gasoline production, steel tank storage and distributing facilities, power house, pumping station and other structures. Plant will handle about 2000 bbl. of crude oil per day, to be secured from producers in Kelvin-Sunburst, Mont., oil field area. Cost over $800,000 with equipment.

Wasselle Metal Products Co., 31 Broadway, Brooklyn, manufacturer of metal goods, has purchased a four-story building on site, 41 x 85 ft., at 235 Berry Street, and will improve for plant. Present works will be removed to new location and capacity increased.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until March 24 for coils, transformers, rheostats, capacitors, tube shelves, etc. (Circular 189).

General Foods Corp., 250 Park Avenue, New York, plans four-story addition to branch plant at Hoboken, N. J., where about 10 acre tract was acquired several months ago. New unit will total about 100,000 sq. ft. of floor space and will be equipped for tin can and container manufacture for coffee products. Completion is scheduled early in August. Cost about $250,000 with equipment.

RCA Mfg. Co., 411 Fifth Avenue, New York, subsidiary of Radio Corp. of America, Inc., 30 Rockefeller Plaza, has asked bids on general contract for one-story and basement addition, 285 x 360 ft., to branch plant at 501 North La Salle Street, Indianapolis, for expansion in radio equipment assembling division. Work will include a new power house, 46 x 80 ft. Cost over $200,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer. H. E. LeRoy is plant manager at Indianapolis.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for centrifugal pumps and spare parts (Schedule 5706) for Brooklyn Navy Yard; heat and flame-resistant electric cable (Schedule 5788); 80 sets of steel deck liner rings (Schedule 5789) for Brooklyn and Philadelphia yards.

Purchasing and Contracting Officer, Quartermaster Corps, Corps Area CCC depot, Schenectady, N. Y., asks bids until March 23 for one vacuum pump, one automatic combination water heater, one induced draft fan (Circular 5222-5).

Mohican Steel Co., Inc., 47-04 Thirtieth Place, Long Island City, N. Y., steel specialties, has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for new one-story plant at Glendale, L. I. Cost over $50,000 with equipment. Felix J. Wasselle, 861 Manhattan Avenue, Brooklyn, is architect.

United States Engineer Office, Army Building, 39 Whitehall Street, New York, asks bids until March 22 for six suction pipe elbows with studs and nuts, 10 front and back head filling rings, two trunnion bearing liners, one water ring for 26-in. pump and one trunnion pipe elbow (Circular 240).

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until March 20 for 30 acid steel, lubricated plug 2-in. flanged valves (Circular 293).

New York Shipbuilding Corp., 40 Wall Street, New York, has approved plans for one-story addition to shop and construction buildings at shipyard, Camden, N. J. Cost over $75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for two motor-driven table-type horizontal boring, drilling and milling machines, with auxiliary spindle (Schedule 5758), engine primers (Schedule 5754); until March 28, four motor-driven air compressors, with motors and controllers, spare parts, tools and wrenches (Schedule 5785) for Philadelphia Navy Yard.

Scott Paper Co., Chester, Pa., will expend close to $1,000,000 this year for completion of addition to local mill and installation of machinery, including new paper-making machine and auxiliary equipment. Work on unit was begun recently. It will represent a gross investment approximating $2,000,000.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until March 21 for one solid rubber-tired, gas-propelled, wheeled warehouse tractor, three-wheel type, without starter, lights or battery (Circular 830); until March 22, two motor-driven drilling machines, 6-in. spindles (Circular 839), one variable speed transmission (Circular 838).

BUFFALO DISTRICT

National Gypsum Co., 190 Delaware Avenue, Buffalo, will expend approximately $1,000,000 this year for expansion and improvements in mills, including addition to branch plant at East River and 150th Street, New York, and completion of mill at Savannah, Ga., on which work was begun a few months ago.

Oneida, Ltd., Oneida, N. Y., operating Oneida Community, Ltd., manufacturer of silverware products, animal traps, etc., has approved plans for one-story addition to branch plant at Sherrill, N. Y. Cost close to $45,000 with equipment.

Constructing Quartermaster, Fort Niagara, N. Y., asks bids until March 27 for bolts and nuts, galvanized iron panel strips, wire mesh reinforcements and other equipment (Circular 6491-25).

NEW ENGLAND

Reed-Prentice Corp., 677 Cambridge Street, Worcester, Mass., machine tools and parts, has let general contract to Fiske-Carter Construction Co., 8 Norwich Street, for one-story addition for expansion in machine shop.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for heat and flame-resistant electric cable (Schedule 5787); until March 28, steel valves (Schedule 5777); until March 31, smoke indicators and spare parts (Schedule 5795) for Boston, Brooklyn, Charleston, Puget Sound and other navy yards; until March 28 one double-housing planer (Schedule 5784) for Boston yard.

A. D. Makepeace Co., High Street, Wareham, Mass., food products, plans two-story addition, 50 x 70 ft., for storage and distribution. Cost close to $50,000 with equipment. J. William Beals & Sons Co., 185 Devonshire Street, Boston, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until March 20 for one mechanical, barrel-type straightening machine (Circular 333), one special automatic drilling and milling machine (Circular 314), one thread-grinder (Circular 302), one punch and die, mounted on die set (Circular 336); until March 21, milling machines (Circular 299); until March 22, 1-ton hydraulic press, bench-type (Circular 335); until March 23, one milling machine (Circular 306); until March 30, one milling machine (Circular 309).

SOUTH ATLANTIC

W. Frank Upchurch, president, Upchurch Packing Co., Atlanta, Ga., is at head of company being organized to build and operate a distilling plant on site near city. It will comprise several one and multi-story units, with storage and distributing buildings, power house and other structures. Georgia fruits will be used as raw material for processing. Cost close to $200,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for following tools and equipment for Charleston, S. C., Navy Yard: horizontal boring, drilling and milling machine (Schedule 5771), five engine lathes (Schedule 5769), all motor driven, one set of plate straightening rolls, eight-roll type, 120-in. between housings (Schedule 5778), one transverse radial drilling machine (Schedule 5796), 3000 ft. of electric insulation cable for arc welding (Schedule 5803), one motor-driven drilling and tapping machine (Schedule 5792), one motor-driven radial drilling machine (Schedule 5798).

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until April 3 for trailers (Circular 398-73); until April 6, automobile parts (Circular 398-89).

Virginia Electric & Power Co., East Franklin Street, Richmond, Va., has arranged appropriation of about $6,145,000 for expansion and improvements this year in electrical, gas and traction properties. Of this amount, about $3,400,000 will be expended in electrical division, including power plant extensions and modernization, transmission and distributing lines, power substations and other structures. Company has recently begun construction of addition to Twelfth Street steam-electric generating station, installation to include a 40,000-kw. turbo-generator unit and auxiliary equipment. Fund of about $161,500 will be used for purchase of shop tools and other shop equipment, automotive equipment, etc.

Bureau of Yards and Docks, Navy Department, Washington, has postponed closing of bids from March 15 to March 29 for 38 electric overhead traveling bridge cranes for navy yards at Boston, New York, Norfolk, Philadelphia, Charleston, S. C., Mare Island and Puget Sound (Specifications 9111).

Director of Public Works, 217 Governor Street, Richmond, Va., asks bids until March 21 for erection of warehouse buildings, about 185,000 sq. ft. of floor space, with water supply systems, including tank and tower, and electric systems, at Deep Water Terminal. G. M. Bowers is director.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 21 for 170 four-way hydraulic control valves, angle valves, bronze unions, pipe hangers, one self-centering chuck, 750 stone drills, ratchet braces, chopping axes and other equipment (Schedule 3434).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for two boring, milling and drilling machines (Schedule 5644), two open-side planers, one hydraulic (Schedule 5791), three radial drills (Schedule 5799) for Norfolk Navy Yard, one boring, drilling and milling machine and attachments (Schedule 5757), one milling machine (Schedule 5729), two turret lathes (Schedule 5730), all motor-driven; valves, faucets, cocks, etc. (Schedule 5765) for White Plains, and Eastern and Western navy yards.

SOUTH CENTRAL

Mobile & Ohio Railroad Co., Mobile, Ala., plans one-story warehouse and equipment building on waterfront. Cost about $75,000 with mechanical-handling and other equipment.

Precision Truing & Machine Tool Co., 515 Scott Street, Covington, Ky., has let general contract to Frank Kampsen, 1804 Monroe Avenue, for one-story machine shop. Cost close to $40,000 with equipment.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Thomas, Ky., asks bids until March 20 for wrought iron black pipe, nipples, tees, unions, ells, 12,200 ft. of wire, cable, 4500 ft. of steel tubing and steel conduit (Circular 906-16).

Commissioner of Welfare, State Welfare Building, Frankfort, Ky., asks bids until

March 21 for incinerator adjacent to refuse disposal works at Medium Security Prison, near La Grange, Ky., including furnace, stack, mechanical-handling equipment and other facilities. Ralph C. Wyatt, first noted address, is chief engineer.

SOUTHWEST

Agar Mfg. Corp., Whippany, N. J., manufacturer of corrugated boxes and containers, has let general contract to Fogel Construction Co., Reliance Building, Kansas City, Mo., for branch plant on Kansas Avenue, Kansas City, Kan. It will consist of three main one-story units, 150 x 400 ft., 60 x 320 ft., and 100 x 400 ft., for general production, corrugating operations, storage and distributing, respectively; also power house, 40 x 60 ft., and office structure, 40 x 120 ft. Cost over $150,000 with equipment.

Board of Public Works, Chillicothe, Mo., asks bids until March 23 for combustion control equipment for municipal power plant. Henrici-Lowry Engineering Co., 114 West Tenth Street, Kansas City, Mo., is consulting engineer.

United States Engineer Office, Manufacturers' Exchange Building, Kansas City, Mo., asks bids until March 21 for one gasoline engine-driven portable air compressor (Circular 129).

Board of Education, Salina, Kan., plans manual training department in new three-story and part basement Senior High School, 185 x 565 ft. Cost about $600,000. Special election has been called on April 4 to vote bonds. Benjamin H. Byrnes, National Bank of America Building, and Charles W. Shaver, United Life Building, are associated architects; Engineering Service Co., Railway Exchange Building, Kansas City, Mo., is mechanical engineer.

San Antonio Portland Cement Co., 1301 West Martin Street, San Antonio, Tex., has asked bids on general contract for addition to power house, with tanks for fuel oil storage and other facilities. Cost close to $40,000. W. E. Simpson Co., Milam Building, is consulting engineer.

City Council, Bryan, Tex., R. G. Williams, city manager, will ask bids soon on general contract for one-story municipal abattoir and meat-packing plant. Cost about $50,000 with equipment. Jack Atkinson and W. Olin Sanders, Jr., are architects; L. D. Royer, Smith-Young Tower Building, San Antonio, Tex., is consulting engineer.

WESTERN PA. DIST.

Allis-Chalmers Mfg. Co., South Seventieth Street, Milwaukee, plans one-story, basement addition, 150 x 500 ft., to branch plant at Columbus and Preble Avenues, Pittsburgh, used primarily for production of electrical transformers and parts. Cost over $400,000 with equipment. Negotiations are under way with city for vacating a street to allow for plant erection. R. T. Stafford is Pittsburgh manager.

Pennsylvania Railroad Co., Pennsylvania Terminal, Pittsburgh, has let general contract to Rust Engineering Co., Clark Building, for new engine house and shops at Oil City, Pa., to replace structures destroyed by fire several months ago. Cost about $185,000 with equipment. W. B. Wood, first noted address, is chief engineer.

OHIO AND INDIANA

International Harvester Co., 180 North Michigan Avenue, Chicago, has approved plans for one-story plant unit at Cincinnati for motor truck division, near branch plant on Lock Street. Superstructure will begin soon. Cost about $350,000 with equipment. O. A. Krueger is chief engineer, first noted address.

Crosley Corp., 1329 Arlington Avenue, Cincinnati, radios and parts, electric refrigerators, etc., has let general contract to M. Marcus Building Co., 2109 Reading Road, for one-story addition, to be known as factory "K." It will replace a structure destroyed by fire some time ago. Cost over $70,000 with equipment.

Cleveland Corrugated Box Co., 7275 Wentworth Avenue, Cleveland, affiliated with General Container Corp., same address, has acquired former plant of Riester & Thesmacher Co., 4600 Brookpark Road, S.W., consisting of one-story unit of about 75,000 sq. ft. of floor space, and smaller structures. It will be modernized for new plant, expanding present capacity.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until March 20 for three starter assemblies (Circular 801); until March 23, 15 radiator air superchargers (Circular 806); until March 29, 10 oil pumps (Circular 803).

Town Council, Amherst, Ohio, has plans for new municipal electric power plant, for which a bond issue of $145,000 recently was approved, installation to include two 345-kw. and one 125-kw. diesel engine-generating units and accessories, switchboard, etc. Floyd G. Browne, Marion, Ohio, is consulting engineer. Board of Public Affairs, Conrad Zilch, president, is in charge.

International Harvester Co., 180 North Michigan Avenue, Chicago, has asked bids on general contract for one-story addition to branch plant on Brookville Road, Indianapolis, 112 x 200 ft. Cost close to $100,000. This is part of expansion to be carried out at this plant, which is given over to production of engines and parts for motor trucks and kindred products, entire development to cost about $1,000,000. Work is under way on one-story addition to foundry No. 3 at plant, for which contract was let recently to J. L. Simmons & Co., Inc., Union Title Building.

MICHIGAN DISTRICT

General Motors Corp., Detroit, has engaged J. Loyd Allen, Architects' and Builders' Building, Indianapolis, architect, to prepare plans for new plant for production of aircraft motors and parts near Indianapolis municipal airport, where negotiations are under way for property. It will consist of several one-story units for parts production and assembling. Cost over $5,000,000 with equipment.

Midland Steel Products Co., Madison Avenue and West 106th Street, Cleveland, pressed steel automobile parts, stampings, etc., has modernization and improvements under way on new branch plant at Detroit, formerly owned by Hupp Motor Car Co., recently acquired.

Sutherland Paper Co., Kalamazoo, Mich., has authorized an expenditure of about $200,000 for machinery and other equipment to be installed in addition to mill, for production of heavy paper board stocks, recently completed.

MIDDLE WEST

Kropp Forge Co., 5301 West Roosevelt Road, Cicero, Chicago, hammered and drop forgings, will ask bids soon on general contract for one-story addition, 80 x 200 ft. Cost over $60,000 with equipment, which will include a 25-ton traveling crane and other mechanical-handling facilities. Meyer & Cook, 820 North Michigan Avenue, Chicago, are architects.

Magnaflux Corp., 605 West Washington Street, Chicago, manufacturer of magnetic processing equipment, has leased about 10,000 sq. ft. in building at 4541-43 North Ravenswood Avenue for plant.

International Harvester Co., 180 North Michigan Avenue, Chicago, has authorized expansion and improvements in tractor-manufacturing plant on West Thirty-first Street, including modernization of different divisions and installation of considerable new machinery. Cost about $800,000 with equipment. Company also has asked bids on general contract for one-story addition to branch plant at Rock Island, Ill., about 36,000 sq. ft. of floor space, primarily for storage and distribution. This is part of a development program to be carried out at latter works, ultimate cost to approximate $5,000,000. O. A. Krueger is chief engineer, first noted address.

City Council, Anita, Iowa, asks bids until March 29 for new municipal electric power plant, including two diesel engine-generator units, exciters, fuel tanks and auxiliary equipment. Cost about $110,000. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Morrell & Co., Ottumwa, Iowa, meat packers, have awarded general contract to Stark Construction Co., Cedar Rapids, Iowa, for two-story and basement addition, 128 x 160 ft. Cost over $100,000 with equipment; also have let general contract to W. A. Klinger, Inc., Warnock Building, Sioux City, Iowa, for one-story addition. Cost over $40,000 with equipment. Henschien, Evards & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Woodward Governor Co., Mill Street, Rockford, Ill., manufacturer of turbine and engine governors, etc., has asked bids on general contract for one-story addition, about 40 x 80 ft. Cost close to $40,000 with equipment. Willis W. Hubbard, Gas & Electric Building, is architect.

Northern States Power Co., Minneapolis, Minn., has been granted authority by the Wisconsin Public Service Commission to build a steam generating plant costing about $1,500,000 on Lower French Island, Mississippi River, at La Crosse, Wis. Work will begin about April 15. John G. Felton, 122 Fifth Avenue, La Crosse, is district manager.

Lafayette County Board, Darlington, Wis., has low bid from Ray J. Eckenrode, 6916 Fifth Avenue, Kenosha, Wis., on general contract for new county highway garage, warehouse and service building, 70 x 200 ft., part two stories and basement, to cost about $80,000 with equipment. Edward P. Noble is county clerk.

Kenosha, Wis., Board of Public Works has tentatively set March 28 for closing bids on $900,000 sewage treatment plant designed by Alvord, Burdick & Howson, consulting engineers, 20 North Wacker Drive, Chicago. H. C. Laughlin is city manager.

Pelton Steel Casting Co., 148 West Dewey Place, Milwaukee, has plans by George Zagel & Bro., architects, 424 East Wells Street, for shop addition, 45 x 100 ft., one-story and basement, and timekeeper's office, 16 ft. sq.

Interstate Drop Forge Co., 4051 North Twenty-seventh Street, Milwaukee, will build a forge shop addition, 80 x 100 ft., one-story and part basement. General contract has been placed with Wisconsin Bridge & Iron Co., 5023 North Thirty-fifth Street.

PACIFIC COAST

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to MacDonald & Kahn, Financial Center Building, San Francisco, for one and multi-story equipment storage and distributing building at Mare Island Navy Yard, at $673,500, exclusive of equipment (Specifications 8742).

Department of Interior, Indian Service, Washington, asks bids until March 24 for power house at Navajo Agency, Fort Defiance, Ariz., including main unit, 48 x 50 ft., with two wing extensions, each 26 x 36 ft., with two high-pressure boiler units, 75-kw. electric generator and accessories, stokers, combustion control apparatus, coal-handling equipment, water-softening equipment and accessories.

Olympia Veneer Co., Olympia, Wash., plans power house, machine shop and other mechanical departments at new plywood mill at Willamina, Ore., where large tract is being secured. Cost close to $400,000 with machinery. It will be operated in name of Pacific Plywood Corp., an affiliated interest.

J. D. Ross, administrator, Bonneville project, Department of Interior, Portland, asks bids until March 20 for machine bolts, eyebolts, lock-nuts, square washers, dead-ending eyes, shackles and corner construction brackets, etc. (Circular 187); until March 22, three 125-ton, single trolley, electric motor-operated overhead traveling cranes, with single runway conductor and supports, for Ampere power substation (Circular 190).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 21 for heat and flame-resistant armored insulated electric cable (Schedule 5786) for Mare Island Navy Yard; until March 28, 16 electric air circuit breakers (Schedule 5779) for Puget Sound yard; steel forgings (Schedule 5800) for Puget Sound and Norfolk yards.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Optimism high, though orders this month are spotty . . . Chevrolet plans $2,000,000 plant near Buffalo . . . International Harvester Co. temporarily suspends buying for its program.

Detroit Feels a Moderate Upturn in Sales of Tools

DETROIT—A moderate upturn in machine tools has been felt recently with three automotive projects reported active and some general equipment being purchased. It has been learned that the Chevrolet project calling for $2,000,000 expenditure near Buffalo has to do with the assembly plant rather than the Tonawanda engine and axle plant. While as yet only in preliminary stages, plans call for a large building addition which will be devoted principally to body work and will, therefore, probably call for welding equipment. Chevrolet is purchasing some equipment for installation in the Toledo plant heretofore devoted to small replacement parts. Some production is to be done in this plant, it is learned. Dodge is making minor changes in its line and is purchasing new equipment as a result. Midland Steel Products Co. is currently installing equipment in the building which it recently purchased from Hupp Motor Car Co. Additional machinery is being installed by Detroit Paper Products Corp. in its three divisions producing corrugated fiber shipping containers, plastics and refrigerator insulation.

Chicago Trade Still Hopeful Though Orders Are Spotty

CHICAGO—The condition of the machine tool market in this district over the past week has been rather spotty. Because of a temporary cessation in buying from the International Harvester Co., some sales agencies have received very little business recently. Others, however, have been picking up miscellaneous orders here and there, and one sales office is quite encouraged over the activity from a wide variety of plants. These orders are not large in most cases, but represent willingness to go ahead and as such are important. This last mentioned company reported more business received in February than in January, which is significant because January orders were better than those for any month since 1937. Thus far in March, they report business equal with the same period last month. General sentiment in the machine tool trade continues optimistic in spite of the fact that some companies of late have noticed a decrease in orders. The purchasing program of the Harvester company is sure to be continued soon, as many of their expansion plans are yet to be completed. The lists of the Milwaukee and Santa Fe remain pending.

Activity at Cleveland Is Holding Up Well

CLEVELAND—Activity is holding up well in this vicinity. The past week developed a number of single machine sales, including tools for an electrical equipment company. An attractive technical school job downstate is active, being of interest because it is free from the usual red tape. Ten lathes, two shapers, two horizontal milling machines, a vertical mill, a 21-in. upright drill, surface grinder and considerable auxiliary equipment will be required, all the foregoing being new equipment and constituting approximately half the order, the balance being used or rebuilt machines.

General Electric here is already taking delivery on some of the recently placed equipment for its new Nela Park auto lamp division in the Pritchard Building. Within only a few days after the issuance of this inquiry for lathes, drilling and milling machines, grinders and shears, the contracts had been placed.

Selling Pace Slackens Slightly But Optimism Is High in East

NEW YORK—There was a moderate falling off in machine tool orders last week compared with the previous week, but there is every indication that the month as a whole will record a substantial volume of orders. Aircraft activity predominates. Sellers are encouraged by the change in the attitude of the Administration toward business and the possible re-establishment of business confidence.

Foreign Orders a Little More Prominent at Cincinnati

CINCINNATI — No appreciable change was noted in volume of machinery ordering in this area the past week. Character of demand, however, shifted more toward foreign sources than has heretofore been the trend this year. Some ordering from automobile manufacturers was a bright spot in the small domestic demand and raised hope of further business from this source. Foreign business consisted of fairly substantial orders for heavy and light lathes, grinders and millers. Planers and boring mills are still in good demand in export trade, but domestic interest is lagging. Drilling tools are still slow, but inquiry for these is as active as in other lines. The production rate tends higher. Several plants are running night shifts through six days while others are holding to five.

February Shipments Off 111,311 Tons For U.S. Steel

SHIPMENTS of finished steel products by subsidiary companies of United States Steel Corp. for February totaled 677,994 tons, compared with 789,305 tons in January, and with 474,723 tons in February 1938.

For 1939 to date, shipments were 1,467,299 tons compared with 993,045 tons in the comparable period of 1938, an increase of 474,254 tons.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 *Per Cent of Capacity	1939 Shipments	1939 *Per Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789,305	51.3
February	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5	677,994	48.8
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	.....	...
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	.....	...
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	.....	...
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	.....	...
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	.....	...
August	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3	.....	...
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	.....	...
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	.....	...
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	.....	...
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	...
Minus yearly adjustment	(—23,750)	...	(—40,859)	...	(—77,113)	...	.....	...	.....	...
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	†6,625,368	†36.6	.....	...

*Annual capacity 18,114,000 gross tons, with monthly percentages based on actual number of weeks in each month.
†Subject to yearly adjustment.